User Guide

Fiber Optic Extenders

FOXBOX Tx / Rx VGA
FOXBOX Tx VGA/YUV
FOXBOX Tx / Rx DVI
FOXBOX Tx / Rx DVI Plus

High Resolution Fiber Optic Transmitters and Receivers

Extron Electronics
INTERFACING, SWITCHING AND CONTROL

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03 11

Safety Instructions • English

This symbol is intended to alert the user of important operating and maintenance (servicing) instructions in the literature provided with the equipment.

This symbol is intended to alert the user of the presence of uninsulated dangerous voltage within the product's enclosure that may present a risk of electric shock.

Caution

Read Instructions • Read and understand all safety and operating instructions before using the equipment.

Retain Instructions • The safety instructions should be kept for future reference.

Follow Warnings • Follow all warnings and instructions marked on the equipment or in the user information.

Avoid Attachments • Do not use tools or attachments that are not recommended by the equipment manufacturer because they may be hazardous.

Warning

Power sources • This equipment should be operated only from the power source indicated on the product. This equipment is intended to be used with a main power system with a grounded (neutral) conductor. The third (grounding) pin is a safety feature, do not attempt to bypass or disable it.

Power disconnection • To remove power from the equipment safely, remove all power cords from the rear of the equipment, or the desktop power module (if detachable), or from the power source receptacle (wall plug).

Power cord protection • Power cords should be routed so that they are not likely to be stepped on or pinched by items placed upon or against them.

Servicing • Refer all servicing to qualified service personnel. There are no user-serviceable parts inside. To prevent the risk of shock, do not attempt to service this equipment yourself because opening or removing covers may expose you to dangerous voltage or other hazards.

Slots and openings • If the equipment has slots or holes in the enclosure, these are provided to prevent overheating of sensitive components inside. These openings must never be blocked by other objects.

Lithium battery • There is a danger of explosion if battery is incorrectly replaced. Replace it only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions.

Consignes de Sécurité • Français

Ce symbole sert à avertir l'utilisateur que la documentation fournie avec le matériel contient des instructions importantes concernant l'exploitation et la maintenance (réparation).

Ce symbole sert à avertir l'utilisateur de la présence dans le boîtier de l'appareil de tensions dangereuses non isolées posant des risques d'électrocution.

Attention

Lire les instructions• Prendre connaissance de toutes les consignes de sécurité et d'exploitation avant d'utiliser le matériel.

Conserver les instructions• Ranger les consignes de sécurité afin de pouvoir les consulter à l'avenir.

Respecter les avertissements • Observer tous les avertissements et consignes marqués sur le matériel ou présentés dans la documentation utilisateur.

Eviter les pièces de fixation • Ne pas utiliser de pièces de fixation ni d'outils non recommandés par le fabricant du matériel car cela risquerait de poser certains dangers.

Avertissement

Alimentations • Ne faire fonctionner ce matériel qu'avec la source d'alimentation indiquée sur l'appareil. Ce matériel doit être utilisé avec une alimentation principale comportant un fil de terre (neutre). Le troisième contact (de mise à la terre) constitue un dispositif de sécurité : n'essayez pas de la contourner ni de la désactiver.

Déconnexion de l'alimentation• Pour mettre le matériel hors tension sans danger, déconnectez tous les cordons d'alimentation de l'arrière de l'appareil ou du module d'alimentation de bureau (s'il est amovible) ou encore de la prise secteur.

Protection du cordon d'alimentation • Acheminer les cordons d'alimentation de manière à ce que personne ne risque de marcher dessus et à ce qu'ils ne soient pas écrasés ou pincés par des objets.

Réparation-maintenance • Faire exécuter toutes les interventions de réparation-maintenance par un technicien qualifié. Aucun des éléments internes ne peut être réparé par l'utilisateur. Afin d'éviter tout danger d'électrocution, l'utilisateur ne doit pas essayer de procéder lui-même à ces opérations car l'ouverture ou le retrait des couvercles risquent de l'exposer à de hautes tensions et autres dangers.

Fentes et orifices • Si le boîtier de l'appareil comporte des fentes ou des orifices, ceux-ci servent à empêcher les composants internes sensibles de surchauffer. Ces ouvertures ne doivent jamais être bloquées par des objets.

Lithium Batterie • Il a danger d'explosion s'll y a remplacment incorrect de la batterie. Remplacer uniquement avec une batterie du meme type ou d'un ype equivalent recommande par le constructeur. Mettre au reut les batteries usagees conformement aux instructions du fabricant.

Sicherheitsanleitungen • Deutsch

Dieses Symbol soll dem Benutzer in der im Lieferumfang enthaltenen Dokumentation besonders wichtige Hinweise zur Bedienung und Wartung (Instandhaltung) geben.

Dieses Symbol soll den Benutzer darauf aufmerksam machen, daß im Inneren des Gehäuses dieses Produktes gefährliche Spannungen, die nicht isoliert sind und die einen elektrischen Schock verursachen können, herrschen.

Achtung

Lesen der Anleitungen • Bevor Sie das Gerät zum ersten Mal verwenden, sollten Sie alle Sicherheits-und Bedienungsanleitungen genau durchlesen und verstehen.

Aufbewahren der Anleitungen • Die Hinweise zur elektrischen Sicherheit des Produktes sollten Sie aufbewahren, damit Sie im Bedarfsfall darauf zurückgreifen können.

Befolgen der Warnhinweise • Befolgen Sie alle Warnhinweise und Anleitungen auf dem Gerät oder in der Benutzerdokumentation.

Keine Zusatzgeräte • Verwenden Sie keine Werkzeuge oder Zusatzgeräte, die nicht ausdrücklich vom Hersteller empfohlen wurden, da diese eine Gefahrenquelle darstellen können.

Vorsicht

Stromquellen • Dieses Gerät sollte nur über die auf dem Produkt angegebene Stromquelle betrieben werden. Dieses Gerät wurde für eine Verwendung mit einer Hauptstromleitung mit einem geerdeten (neutralen) Leiter konzipiert. Der dritte Kontakt ist für einen Erdanschluß, und stellt eine Sicherheitsfunktion dar. Diese sollte nicht umgangen oder außer Betrieb gesetzt werden.

Stromunterbrechung • Um das Gerät auf sichere Weise vom Netz zu trennen, sollten Sie alle Netzkabel aus der Rückseite des Gerätes, aus der externen Stomversorgung (falls dies möglich ist) oder aus der Wandsteckdose ziehen.

Schutz des Netzkabels • Netzkabel sollten stets so verlegt werden, daß sie nicht im Weg liegen und niemand darauf treten kann oder Objekte darauf- oder unmittelbar dagegengestellt werden können.

Wartung • Alle Wartungsmaßnahmen sollten nur von qualifiziertem Servicepersonal durchgeführt werden. Die internen Komponenten des Gerätes sind wartungsfrei. Zur Vermeidung eines elektrischen Schocks versuchen Sie in keinem Fall, dieses Gerät selbst öffnen, da beim Entfernen der Abdeckungen die Gefahr eines elektrischen Schlags und/oder andere Gefahren bestehen.

Schlitze und Öffnungen • Wenn das Gerät Schlitze oder Löcher im Gehäuse aufweist, dienen diese zur Vermeidung einer Überhitzung der empfindlichen Teile im Inneren. Diese Öffnungen dürfen niemals von anderen Objekten blockiert werden.

Litium-Batterie • Explosionsgefahr, falls die Batterie nicht richtig ersetzt wird. Ersetzen Sie verbrauchte Batterien nur durch den gleichen oder einen vergleichbaren Batterietyp, der auch vom Hersteller empfohlen wird. Entsorgen Sie verbrauchte Batterien bitte gemäß den Herstelleranweisungen.

Instrucciones de seguridad • Español

Este símbolo se utiliza para advertir al usuario sobre instrucciones importantes de operación y mantenimiento (o cambio de partes) que se desean destacar en el contenido de la documentación suministrada con los equipos.

Este símbolo se utiliza para advertir al usuario sobre la presencia de elementos con voltaje peligroso sin protección aislante, que puedan encontrarse dentro de la caja o alojamiento del producto, y que puedan representar riesgo de electrocución.

Precaucion

Leer las instrucciones • Leer y analizar todas las instrucciones de operación y seguridad, antes de usar el equipo.

Conservar las instrucciones • Conservar las instrucciones de seguridad para futura consulta.

Obedecer las advertencias • Todas las advertencias e instrucciones marcadas en el equipo o en la documentación del usuario, deben ser obedecidas.

Evitar el uso de accesorios • No usar herramientas o accesorios que no sean especificamente recomendados por el fabricante, ya que podrian implicar riesgos.

Advertencia

Alimentación eléctrica • Este equipo debe conectarse únicamente a la fuente/tipo de alimentación eléctrica indicada en el mismo. La alimentación eléctrica de este equipo debe provenir de un sistema de distribución general con conductor neutro a tierra. La tercera pata (puesta a tierra) es una medida de seguridad, no puentearia ni eliminaria.

Desconexión de alimentación eléctrica • Para desconectar con seguridad la acometida de alimentación eléctrica al equipo, desenchufar todos los cables de alimentación en el panel trasero del equipo, o desenchufar el módulo de alimentación (si fuera independiente), o desenchufar el cable del receptáculo de la pared.

Protección del cables de alimentación • Los cables de alimentación eléctrica se deben instalar en lugares donde no sean pisados ni apretados por objetos que se puedan apoyar sobre ellos.

Reparaciones/mantenimiento • Solicitar siempre los servicios técnicos de personal calificado. En el interior no hay partes a las que el usuario deba acceder. Para evitar riesgo de electrocución, no intentar personalmente la reparación/mantenimiento de este equipo, ya que al abrir o extraer las tapas puede quedar expuesto a voltajes peligrosos u otros riesgos.

Ranuras y aberturas • Si el equipo posee ranuras o orificios en su caja/alojamiento, es para evitar el sobrecalientamiento de componentes internos sensibles. Estas aberturas nunca se deben obstruir con otros objetos.

Batería de litio • Existe riesgo de explosión si esta batería se coloca en la posición incorrecta. Cambiar esta batería únicamente con el mismo tipo (o su equivalente) recomendado por el fabricante. Desachar las baterías usadas siguiendo las instrucciones del fabricante.

安全须知 • 中文

这个符号提示用户该设备用户手册中有重要的操作和维护说明。

这个符号警告用户该设备机壳内有暴露的危险电压，有触电危险。

注意

阅读说明书 • 用户使用该设备前必须阅读并理解所有安全和使用说明。

保存说明书 • 用户应保存安全说明书以备将来使用。

遵守警告 • 用户应遵守产品和用户指南上的所有安全和操作说明。

避免追加 • 不要使用该产品厂商没有推荐的工具或追加设备，以避免危险。

警告

电源 • 该设备只能使用产品上标明的电源。 设备必须使用有地线的供电系统供电。 第三条线（地线）是安全设施，不能不用或跳过 。

拔掉电源 • 为安全地从设备拔掉电源，请拔掉所有设备后或桌面电源的电源线，或任何接到市电系统的电源线。

电源线保护 • 妥善布线， 避免被踩踏，或重物挤压。

维护 • 所有维修必须由认证的维修人员进行。 设备内部没有用户可以更换的零件。为避免出现触电危险不要自己试图打开设备盖子维修该设备。

通风孔 • 有些设备机壳上有通风槽或孔，它们是用来防止机内敏感元件过热。 不要用任何东西挡住通风孔。

锂电池 • 不正确的更换电池会有爆炸的危险。必须使用与厂家推荐的相同或相近型号的电池。按照生产厂的建议处理废弃电池。

FCC Class A Notice

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. Operation is subject to the following two conditions:

1. This device may not cause harmful interference.
2. This device must accept any interference received, including interference that may cause undesired operation.

The Class A limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his own expense.

NOTE: This unit was tested with shielded cables on the peripheral devices. Shielded cables must be used with the unit to ensure compliance with FCC emissions limits.

For more information on safety guidelines, regulatory compliances, EMI/EMF compliance, accessibility, and related topics, **click here**.

Copyright

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Trademarks

All trademarks mentioned in this guide are the properties of their respective owners.

Conventions Used in this Guide

In this user guide, the following are used:

NOTE: A note draws attention to important information.

TIP: A tip provides a suggestion to make working with the application easier.

CAUTION: A caution indicates a potential hazard to equipment or data.

WARNING: A warning warns of things or actions that might cause injury, death, or other severe consequences.

Commands are written in the fonts shown here:

```
^AR Merge Scene,,Op1 scene 1,1 ^B 51 ^W^C
```

```
[Ø1] R ØØØ4 ØØ3ØØ ØØ4ØØ ØØ8ØØ ØØ6ØØ [Ø2] 35 [17] [Ø3]
```

Esc X1 * X22 * X24 * X24 * X25 CE ←

NOTE: For commands and examples of computer or device responses mentioned in this guide, the character "Ø" is used for the number zero and "O" represents the capital letter "o."

Computer responses and directory paths that do not have variables are written in the font shown here:

```
Reply from 2Ø8.132.18Ø.48: bytes=32 times=2ms TTL=32
```

```
C:\Program Files\Extron
```

Variables are written in slanted form as shown here:

```
ping xxx.xxx.xxx.xxx –t
```

```
SOH R Data STX Command ETB ETX
```

Selectable items, such as menu names, menu options, buttons, tabs, and field names are written in the font shown here:

From the **File** menu, select **New**.

Click the **OK** button.

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Introduction

WARNING: The FOXBOX Tx/Rx units output continuous invisible light, which may be harmful to the eyes; use with caution.

- ***Do not look*** into the rear panel fiber optic cable connectors or into the fiber optic cables themselves.
- Plug the attached dust caps into the optical transceivers when the fiber cable is unplugged.

- About the FOXBOX Tx/Rx Transmitters and Receivers
- Features

This manual contains information about the Extron FOXBOX family of fiber optic products. The FOXBOX family supports long distance transmission of VGA, YUV, and DVI video and analog audio signals (see figure 1).

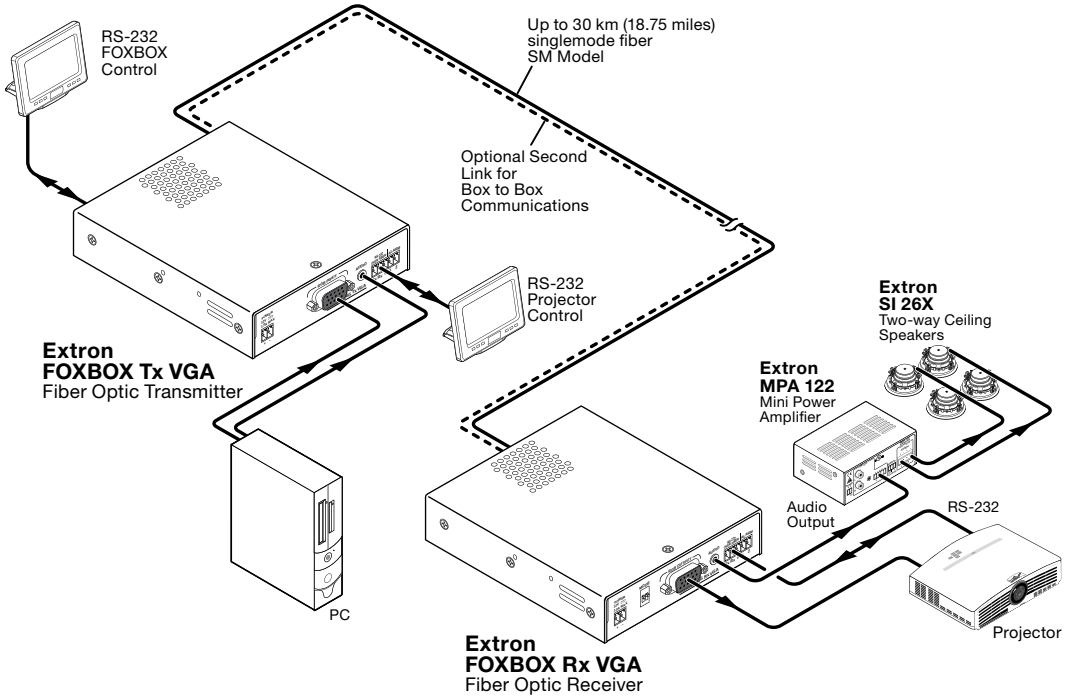


Figure 1. Typical FOXBOX Tx/Rx Application

About the FOXBOX Tx/Rx Transmitters and Receivers

The FOXBOX family consists of the following ultra-high performance fiber optic transmitters and receivers:

- **FOXBOX Tx VGA transmitter —** Accepts an analog RGB video input, an audio input, and an RS-232 serial input and outputs a proprietary optical signal on an LC connector to a FOXBOX or FOX 500 receiver. It also can receive a proprietary optical signal from the receiver consisting of the RS-232 return from a controlled device.
- **FOXBOX Tx VGA/YUV transmitter —** Similar to the FOXBOX Tx VGA, but with the ability to support bi-level and tri-level YUV formats such as the 480p, 576p, 720p, 1080i, and 1080p HDTV rates. It can also accept RGBHV video.
- **FOXBOX Rx VGA receiver —** Accepts a proprietary optical signal on an LC connector from a FOXBOX (except FOXBOX Tx DVI Plus) or FOX 500 transmitter or daisy-chained receiver and outputs analog RGB or component video, audio, and RS-232 serial commands. It also can either:
  - Receive an RS-232 return from a controlled device and send it to the transmitter via a proprietary optical signal.
  - Output a daisy-chained signal to another receiver.
- **FOXBOX Tx DVI Plus transmitter —** Accepts a single link of DVI video input (up to 1920 x 1200 at 60 Hz), an audio input, and an RS-232 serial input and outputs a proprietary optical signal on an LC connector to a FOXBOX Rx DVI Plus receiver only. It also can receive a proprietary optical signal from the receiver consisting of the RS-232 return from a controlled device.
- **FOXBOX Rx DVI Plus receiver —** Accepts a proprietary optical signal on an LC connector from a FOXBOX or FOX 500 transmitter or daisy-chained receiver and outputs a single link of DVI video, audio, and RS-232 serial commands. It also can either:
  - Receive an RS-232 return from a controlled device and send it to the transmitter via a proprietary optical signal.
  - Output a daisy-chained signal to another receiver.
- **FOXBOX Tx DVI (non-Plus) transmitter —** Similar to the FOXBOX TX DVI Plus, but with a lower maximum resolution (1600 x 1200 or 1080p @ 60 Hz) and a different proprietary output that is compatible with all FOXBOX or FOX 500 receivers.
- **FOXBOX Rx DVI (non-Plus) receiver —** Similar to FOXBOX RX DVI Plus, but with lower maximum resolution (1600 x 1200 or 1080p @ 60 Hz) and receiving a different proprietary input. This receiver is discontinued, but included in this list for reference only.

NOTES:
- In this manual, the term "FOXBOX" refers to either an analog RGB, YUV, or DVI video unit. Where differences exist between the VGA and DVI models, the full name of the unit is used.
- In this manual, the term "FOXBOX DVI" refers to either the Plus or non-Plus DVI units unless a unit is specifically identified.

General System Operation

The FOXBOX Tx VGA transmitter inputs VGA-UXGA RGB video.

The FOXBOX Tx VGA/YUV transmitter inputs YUV video or VGA-UXGA RGB video.

The FOXBOX Tx DVI transmitter inputs a single link of DVI video.

All three transmitters input audio and one-way (transmitter-to-receiver) RS-232 serial communication (for applications such as projector control). The transmitters convert all of their inputs into a proprietary signal and output the signal on a single fiber optic cable to the receiver. An optional return (receiver-to-transmitter) stream of serial RS-232 communications, such as projector responses, requires a second fiber optic cable. Rather than the return RS-232 communications, the receivers can be configured to output a daisy-chained primary fiber optic signal to another receiver.

The FOXBOX Rx VGA receiver outputs VGA-UXGA RGB or YUV video.

The FOXBOX Rx DVI receiver outputs a single link of DVI video.

The receivers convert the proprietary signal(s) back to video (either RGB, YUV, or DVI as applicable to the model), audio, and serial RS-232 communication and output the signals locally. If either RS-232 return or daisy-chained communications are implemented (a second fiber optic cable is installed), the receiver outputs a proprietary signal on the second fiber optic cable. For video resolutions up to 1600 x 1200 or 1920 x 1200, the video output of the receiver is a perfect, pixel-for-pixel recreation of the video signal input to the transmitter.

The FOXBOX VGA transmitter can handle an RGBHV, RGBS, RGsB, or RsGsBs input signal. The FOXBOX VGA receiver can output RGBHV or RGsB video, as selected by the user, when the input is RGB. The FOXBOX VGA receiver can output YUV video when the input is YUV video to a FOXBOX VGA/YUV transmitter only.

NOTE: When YUV video is input to a FOXBOX Tx VGA/YUV, the output of the receiver is YUV video **only**. Neither unit can convert the video into the RGB format.

The transmitter and receiver have image and audio adjustments available under RS-232 control. Both units have image, audio, and fiber light status and lost-light alarm indicators.

The receivers have built-in alternating pixels, color bars, and grayscale test patterns to assist in setting up the display equipment.

System Compatibility

The FOXBOX Tx DVI Plus transmitter fiber optic output signal can be received only by a FOXBOX Rx DVI Plus receiver.

All fiber optic signals from all other units are interchangeably compatible between VGA and DVI units, Plus and non-Plus units, and PowerCage Fox and FOX 500 units as shown in the following table.

Receiver	Compatible transmitter(s)
FOXBOX Rx VGA	FOXBOX Tx VGA FOXBOX Tx VGA/YUV FOXBOX Tx DVI (non-Plus) PowerCage FOX Tx VGA PowerCage FOX Tx DVI (non-Plus) FOX 500 Tx (VGA) FOX 500 Tx DVI FOX 500 DA6
FOXBOX Rx DVI Plus	FOXBOX Tx DVI Plus FOXBOX Tx DVI (non-Plus) FOXBOX Tx VGA FOXBOX Tx VGA/YUV PowerCage FOX Tx DVI Plus PowerCage FOX Tx DVI (non-Plus) PowerCage FOX Tx VGA FOX 500 Tx (VGA) FOX 500 Tx DVI FOX 500 DA6
FOXBOX Rx DVI (non Plus)	FOXBOX Tx DVI (non-Plus) FOXBOX Tx VGA FOXBOX Tx VGA/YUV PowerCage FOX Tx DVI (non-Plus) PowerCage FOX Tx VGA FOX 500 Tx (VGA) FOX 500 Tx DVI FOX 500 DA6

NOTES:
- The FOXBOX units are fully compatible with all Extron FOX 500 products and a variety of other fiber optic products. Those other products are identified where appropriate, but not specifically described in this manual.
- The FOXBOX DVI does not support the transmission of signals with High-bandwidth Digital Content Protection (HDCP).

Cable Transmission Modes

The transmitters and receivers are further categorized by the type of fiber optic cable, multimode or singlemode, which define the effective range of transmission:

- **Multimode —** Long distance, up to 2 km (6,560 feet) (depending on the fiber cable)
  - FOXBOX Tx VGA MM
  - FOXBOX Rx VGA MM
  - FOXBOX Tx VGA/YUV MM
  - FOXBOX Tx DVI MM
  - FOXBOX Rx DVI MM
  - FOXBOX Tx DVI Plus MM
  - FOXBOX Rx DVI Plus MM
- **Singlemode —** Very long distance, up to 30 km (18.75 miles)
  - FOXBOX Tx VGA SM
  - FOXBOX Rx VGA SM
  - FOXBOX Tx VGA/YUV SM
  - FOXBOX Tx DVI SM
  - FOXBOX Rx DVI SM
  - FOXBOX Tx DVI Plus SM
  - FOXBOX Rx DVI Plus SM

NOTE: The multimode and singlemode products are physically and functionally identical, with the exception of the effective range of transmission. In this manual, any reference applies to either transmission mode unless otherwise specified.

Features

Ultra high performance — Offers pixel-for-pixel RGBHV video or DVI video transmission, up to 1920 x 1200 at 60 Hz (FOXBOX DVI Plus models) or 1600 x 1200 at 60 Hz.

Video input —

- **FOXBOX VGA —** The transmitter accepts RGBHV, RGBS, RGsB, or RsGsBs on a 15-pin HD connector.
- **FOXBOX VGA/YUV —** The transmitter accepts bi-level or tri-level YUV, RGBHV, or RGBS on a 15-pin HD connector.
- **FOXBOX DVI —** The transmitter accepts a single link of DVI-D video on a DVI-I connector.

EDID emulation mode (FOXBOX Tx DVI and FOXBOX Tx DVI Plus only) — The FOXBOX DVI transmitter provides a function, under RS-232 control, for specifying the rate of the incoming DVI signal. EDID emulation mode allows proper operation when no local monitor is present.

Video output —

- **FOXBOX VGA —** The receiver outputs RGBHV or RGsB video (user-selectable) or YUV video (if the input is YUV video to a FOXBOX Tx VGA/YUV) on a 15-pin HD connector.
- **FOXBOX DVI —** The receiver outputs a single link of DVI-D video on a DVI-I connector.
- **FOXBOX VGA and FOXBOX DVI are mutually compatible —** Enables ultra-long distance DVI-to-analog RGB and analog RGB-to-DVI conversion without the need for extra signal conversion devices.

Compatibility with FOX 500 DA6 distribution amplifier and FOX Matrix Switchers

Audio input — The transmitters accept an unbalanced stereo or mono audio input on a 3.5 mm mini jack.

Audio input gain/attenuation — The input audio level can be adjusted within a range of -18 dB (attenuation) to +10 dB (gain) via the RS-232 link.

Audio output — The receivers output unbalanced stereo audio on a 3.5 mm mini jack.

Links monitoring — The front panels of the transmitters and receivers have indicators for monitoring image and audio transmission and both fiber optic links.

Loss-of-light alarms — The rear panels of the transmitters and receivers have discrete outputs that indicate if either of the fiber optic links have suffered a loss of the light signal.

FOX Extender Control Program — For RS-232 remote control from a PC, the Extron FOX Extenders Control Program provides a graphical interface and drag-and-drop/point-and-click operation.

Simple Instruction Set (SIS™) — The transmitters and receivers use the SIS for easy remote control operation.

Audio level — The audio output is at the consumer level (-10 dBV).

Upgradable firmware — The firmware that controls the operation of each unit can be upgraded in the field via an RS-232 link without taking the unit out of service. Firmware upgrades are available for download on the Extron website, **www.extron.com**, and they can be installed using the FOX Extender Control Program.

Memory presets — 30 memory presets are a time-saving feature that lets you store input size and position settings relative to a specific input resolution. You can then recall those settings, when needed, using the SIS or the control software.

Rack mounting — All FOXBOX Tx and Rx units are rack mountable in any conventional 19-inch wide rack, using an Extron 9.5-inch or 6-inch deep rack shelf.

Power — The 100 VAC to 240 VAC, 50-60 Hz external power supply for each unit provides worldwide power compatibility.

Installation and Operation

This sections details the installation of the FOXBOX Tx/Rx, including:

- **Installation Overview**
- **Mounting the Unit**
- **Connections and Configuration**
- **Operation**

Installation Overview

Follow these steps to install and set up an Extron FOXBOX transmitter and receiver system for operation:

1. Turn off all of the equipment. Ensure that the video sources and the output display are all turned off and disconnected from the power source.
2. Mount the transmitter and one or more receivers (see "**Mounting the Unit**", below).
3. Connect the cables and configure the receivers (see "**Connections and Configuration**").
4. Plug in the power supplies, then turn on the display devices and the input devices.

Mounting the Unit

CAUTION: Installation and service must be performed by authorized personnel only.

Detailed mounting instructions can be found in the "**Reference Information**" section. Any of the 1-inch high, quarter-rack width units can be placed on a tabletop, mounted on a rack shelf, mounted under or through a desk or other furniture, or mounted to a projector bracket.

Connections and Configuration

Transmitter Connections and Indicators

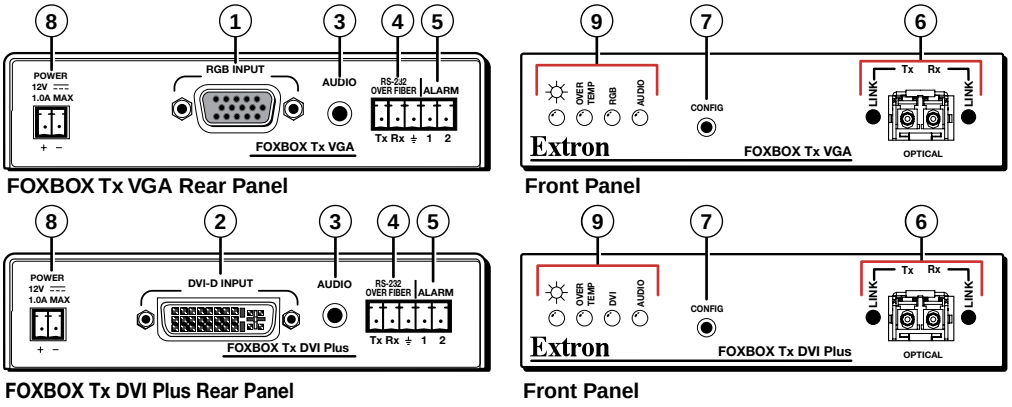


Figure 2. FOXBOX Tx Transmitter Connectors

NOTES:
- The FOXBOX Tx VGA/YUV looks similar to the FOXBOX Tx VGA, with the exception of the name on the unit and the label on the input connector.
- The FOXBOX Tx DVI (non-Plus) looks similar to the FOXBOX Tx DVI Plus, with the exception of the name on the unit.

① **RGB and RGB/YUV Input connectors**

FOXBOX Tx VGA — Connect an analog VGA-UXGA RGB video source to this 15-pin HD female connector.

FOXBOX Tx VGA/YUV — Connect bi-level or tri-level sync YUV video or an analog VGA-UXGA RGB video source to this 15-pin HD female connector.

② **DVI-I Input connector (FOXBOX DVI only) —** Connect a single link of DVI-D to this DVI-I connector (see "**DVI connector (FOXBOX DVI)**" on page 14 for pin assignments).

NOTE: The FOXBOX DVI accepts only the digital signals on the DVI-I Input connector. The analog pins on the port are not connected.

③ **Audio connector —** Plug an audio input into the transmitter via this stereo mini jack connector.

NOTE: See figure 3 to identify the tip, ring, and sleeve when you are making connections for the transmitter from existing audio cables. A mono audio connector consists of the tip and sleeve. A stereo audio connector consists of the tip, ring, and sleeve.

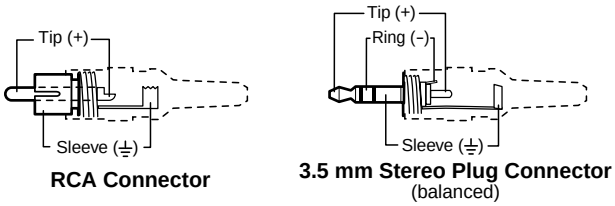
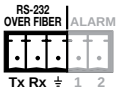


Figure 3. Typical Audio Connectors

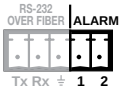
The input audio level can be set via RS-232 control (see "**Remote Control**").

④ **RS-232 Over Fiber port —** If you want the FOXBOX to pass serial command signals to the receiver, for serial control of a projector for example, connect the host device to the transmitter via the first three leftmost poles (Tx, Rx, and ⏚) of this 5-pole captive screw connector (see "**RS-232 connections**" on page 15 to wire this connector).



NOTES:
- If you connect only one fiber optic cable (**item ⑥**, below), or you configure the receiver for daisy-chaining, you will not receive reports from the controlled device. To receive responses from the controlled device, you must install two fiber optic cables and leave the FOXBOX receiver in normal configuration (Mode DIP switch 1 down on the receiver).
- The FOXBOX can pass RS-232 commands and responses at rates up to 115200 baud.

⑤ **Alarm outputs port —** For remote monitoring of the status of fiber optic link 2, connect a locally-constructed or furnished monitoring device to the transmitter via the two rightmost poles (1 and 2) of this 5-pole captive screw connector. When the transmitter does not detect a light link on fiber cable Rx (optional), pin 1 and pin 2 of this port are shorted together (see "**Alarm outputs connection**" on page 15 to wire this connector).



⑥ **Fiber optic connectors and LEDs —**

WARNING: These units output continuous invisible light, which may be harmful to the eyes; use with caution. For additional safety, plug the attached dust caps into the optical transceivers when the fiber cable is unplugged.

NOTES:
- Ensure that you use the proper fiber cable for your transmitter/receiver pair. Typically, singlemode fiber has a yellow jacket and multimode cable has an orange or aqua jacket.
- Only one fiber optic cable, transmitter Tx to receiver Rx, is required for video, audio, and serial command transmission. But, if you connect only one fiber optic cable, or if your transmitter is configured to daisy-chain the optical signal, system functionality is reduced. You ***will not*** receive RS-232 reports from the controlled device, and some FOX Extender Control Program functions and RS-232 commands will not work. To receive responses from the controlled device and for full functionality, you need to install both fiber optic cables and leave the FOXBOX receiver in normal configuration (Mode DIP switch 1 down on the receiver).

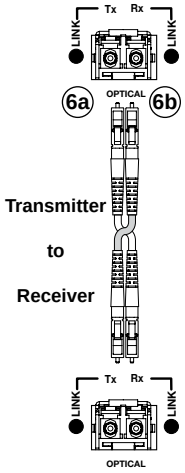
⑥a **Tx (required) —** For all one-way video, audio, and serial communications from the transmitter to the receiver, connect a fiber optic cable to the Tx LC connector.

Connect the free end of this fiber optic cable to the Rx connector on the FOXBOX Rx receiver (**item ⑮** on figure 4) or to any other compatible Extron FOX device.

⑥b **Rx (optional) —** Connect a fiber optic cable for all one-way return serial communications from the receiver to the transmitter.

Connect the free end of this fiber optic cable to the Tx connector on a FOXBOX Rx receiver in normal configuration (**item ⑮** on figure 4) or to any other compatible Extron FOX device.

Tx Link and Rx Link LEDs — When lit, the link is active (light is received).



⑦ **Configuration port —** Connect a controlling device, such as a PC, to this port via a 2.5 mm mini jack TRS RS-232 cable for RS-232 protocol control of all FOXBOX functions. See "**Front panel Configuration ports**" on page 16 for more details on the adapter cable and "**Remote Control**" on page 19 for SIS commands and software control.

The TRS RS-232 cable is included with the Tx models.

⑧ **DC power connector —** Plug the included external 12 VDC power supply into this connector (see "**Power supply wiring**" on page 17, to wire the connector.

⑨ **Indicators —**

Power LED — This LED lights to indicate that power is applied to the unit.

Over Temp LED — This LED lights to indicate that the unit is operating at a dangerously high temperature (approximately 167 °F [75 °C]) and that equipment damage is imminent.

RGB (FOXBOX VGA), RGB/YUV (FOXBOX VGA/YUV), or DVI (FOXBOX DVI) LED — This LED lights when the transmitter detects a signal on its video input, as follows:

RGB LED — Horizontal sync (H) (for RGBHV video) or Green (Sync on green) (G) (for RGsB or RsGsBs video)

RGB/YUV LED — Horizontal sync (H) (for RGBHV video) or luminance (Y) (for component video)

DVI LED — DVI video input

Audio LED — This LED lights when the transmitter detects a low level audio signal for a short period of time. It goes dark if the audio signal drops below the minimum threshold for a short period of time.

Receiver Connections and Indicators

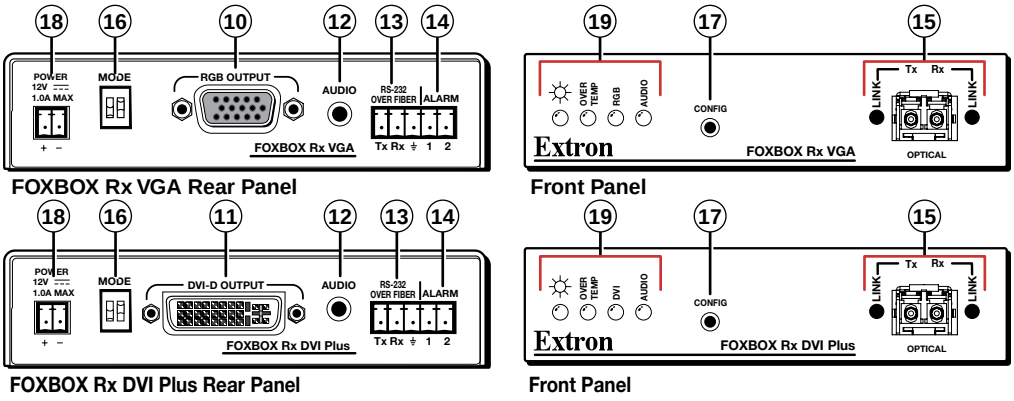


Figure 4. FOXBOX Rx Receiver Connectors

⑩ **RGB Output connector (FOXBOX Rx VGA only) —** Connect an analog VGA-UXGA RGB or YUV video display to this 15-pin HD female connector.

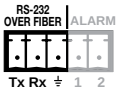
> **NOTE:** If the transmitter input is RGB video, you can set the receiver to output the desired video format: RGBHV or RGsB video.
> If the input to a FOXBOX Tx VGA/YUV is component video, the output of the receiver is YUV video only. Neither unit can convert the video into the RGB format.

⑪ **DVI-I Output connector (FOXBOX DVI only) —** Connect a DVI video display to this DVI-I connector (see "**DVI connector (FOXBOX DVI)**" on page 14 for pin assignments.

> **NOTE:** The FOXBOX DVI outputs only the digital signals on the DVI-I Output connector. The analog pins on the port are not connected.

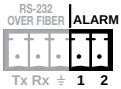
⑫ **Audio connector —** Plug an audio device into this stereo mini jack connector. See **figure 3** on page 8 for wiring.

⑬ **RS-232 Over Fiber port —** If you want the FOXBOX to pass serial command signals to the receiver, for serial control of a projector for example, connect the host device to the transmitter via the first three leftmost poles (Tx, Rx, and ⏚) of this 5-pole captive screw connector (see "**RS-232 connections**" on page 15 to wire this connector.



> **NOTES:**
> - If you connect only one fiber optic cable (**item ⑮**, on the next page), or you configure the receiver for daisy-chaining, you will not receive reports from the controlled device. To receive responses from the controlled device, you must install two fiber optic cables and leave the FOXBOX receiver in normal configuration (Mode DIP switch 1 down).
> - The FOXBOX can pass RS-232 commands and responses at rates up to 115200 baud.

⑭ **Alarm outputs port —** For remote monitoring of the status of fiber optic link 1, connect a locally-constructed or furnished monitoring device to the receiver via the two rightmost poles (1 and 2) of this 5-pole captive screw connector. When the receiver does not detect a light link on fiber cable Tx, pin 1 and pin 2 of this port are shorted together.



⑮ **Fiber optic connectors and LEDs —**

WARNING: These units output continuous invisible light, which may be harmful to the eyes; use with caution. For additional safety, plug the attached dust caps into the optical transceivers when the fiber cable is unplugged.

NOTES:

- You can connect the transmitter to one or more receivers in one of three ways:
  - **One way (transmitter-Tx-to-receiver-Rx) only —** Connect fiber cable ⑮a (from transmitter connector ⑥a) **only**.
  - **Two way (transmitter to receiver and return) —** Connect fiber cable ⑮a (from transmitter connector ⑥a) and fiber cable ⑮b back to the transmitter (connector ⑥b). See figure 5.
  - **One way (transmitter to receiver) with daisy chain (receiver to receiver) —** Connect fiber cable ⑮a from a fiber optic source and cable ⑮b to the next receiver in the daisy chain. See figure 6. Set each receiver in the daisy chain to daisy chain mode (Mode DIP switch 1 up.) Up to 10 properly-configured receivers can be connected in a daisy chain to a single transmitter.
- See the transmitter fiber connector **NOTES** on page 9, which also apply to these connectors.

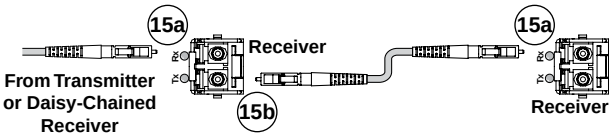


Figure 6. Daisy Chain Configuration

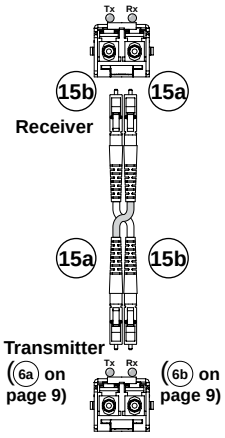


Figure 5. Two Way Configuration

⑮a **Rx (required) —** For all one-way video, audio, and serial communications from the transmitter to the receiver, connect a fiber optic cable to the Rx LC connector.

Connect the free end of this fiber optic cable to the Tx connector on the FOXBOX Tx transmitter (**item ⑥** on page 9) or to any other compatible Extron FOXBOX device.

⑮b **Tx (optional) —** Connect a fiber optic cable to the Tx LC connector for either of the following functions:

Normal configuration — For all one-way return serial communications from the receiver to the Rx connector on the transmitter. See figure 5.

Daisy chain configuration — For daisy-chained video, audio, and serial communications to the Rx connector on another receiver. See figure 6.

NOTE: The Tx connector emits light in either case and the Rx port receives light.

Connect the free end of this fiber optic cable to either:

- The Rx connector on the FOXBOX Tx transmitter (**item ⑥** on page 9) or to any other compatible Extron FOX device
- The Rx connector on another receiver in the daisy chain

Tx Link and Rx Link LEDs — When lit, the link is active (light is received).

⑯ **Mode switch —**

DIP switch 1 — To connect the received optical input to another receiver in a daisy chain configuration, set DIP switch 1 to up as shown. Up to 10 properly-configured receivers can be connected in a daisy chain to a single transmitter.

DIP Switch 2 — DIP switch 2 must be set to the up position for the receiver to respond properly to the **Video Shutdown Delay** SIS command.

⑰ **Configuration port —** Connect a controlling device, such as a PC, to this port via a 2.5 mm mini jack TRS RS-232 cable for RS-232 protocol control of all FOXBOX functions. See "**Front panel Configuration ports**" on page 16 for more details on the adapter cable and "**Remote Control**" on page 19 for SIS commands and software control.

The TRS RS-232 cable is included with the Tx models.

⑱ **DC power connector —** Plug the included external 12 VDC power supply into this connector (see "**Power supply wiring**" on page 17 to wire the connector.

⑲ **Indicators —**

Power LED — This LED lights to indicate that power is applied to the unit.

Over Temp LED — This LED lights to indicate that the unit is operating at a dangerously high temperature (approximately 167 °F [75 °C]) and that equipment damage is imminent.

RGB (FOXBOX VGA) or DVI (FOXBOX DVI) LED — This LED lights on the receiver when the transmitter detects a signal on its video input, as follows:

RGB LED — Horizontal sync (H) (for RGBHV video) or Green (Sync on green) (G) (for RGsB or RsGsBs video)

RGB/YUV LED — Horizontal sync (H) (for RGBHV video) or luminance (Y) (for component video)

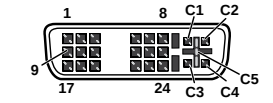
DVI LED — DVI video input

Audio LED — This LED lights on the receiver when the transmitter detects a low level audio signal for a short period of time. It goes dark if the audio signal drops below the minimum threshold for a short period of time.

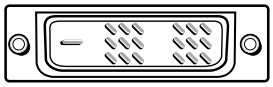
Making Connections

DVI connector (FOXBOX DVI)

Figure 7 defines the DVI pin assignments.



Female Connector



Male Connector

Pin	Signal	Pin	Signal	Pin	Signal
1	TMDS data 2–	9	TMDS data 1–	17	TMDS data 0–
2	TMDS data 2+	10	TMDS data 1+	18	TMDS data 0+
3	TMDS data 2 shield	11	TMDS data 1shield	19	TMDS data 0 shield
4	Spare	12	Spare	20	Spare
5	Spare	13	Spare	21	Spare
6	DDC clock	14	+5 V power	22	
7	DDC data	15	Ground (+5 V)	23	TMDS clock+
8	No connection	16	Hot Plug Detect	24	TMDS clock–
C1	Analog Red Video	C3	Analog Blue Video	C5	Analog Ground
C2	Analog Green Video	C4	Analog H. Sync		

Figure 7. DVI Connectors

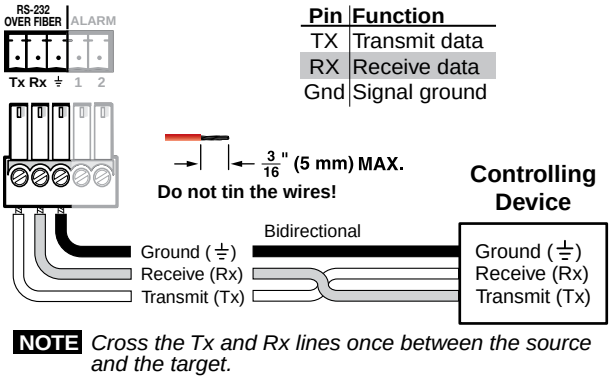
NOTE: The missing pins on the included DVI cable are not required for the single link of DVI-D data supported by the FOXBOX DVI. The analog video pins are not connected. All of these unused pins are shaded gray in the figure above.

DVI signals run at a very high frequency and are especially prone to errors caused by bad video connections, too many adapters, or excessive cable length. To avoid the loss of an image or jitter, follow these guidelines:

- Do not exceed 16.4 feet (5 meters) on the input or buffered loop-through of the FOXBOX DVI transmitter or the output of the FOXBOX DVI receiver.
- Use only the cable designed for DVI signals that is supplied by Extron.
- Limit or avoid the use of adapters.
- Use only cables specifically intended for DVI or HDMI signals. Use of non-DVI or non-HDMI cables or modified cables can result in a missing video output.

RS-232 connections

The RS-232 Over Fiber port is for transmission of serial signals, such as projector control signals, between the transmitter and receiver.



NOTE *Cross the Tx and Rx lines once between the source and the target.*

Figure 8. RS-232 Over Fiber Connector

CAUTION: The length of the exposed (stripped) copper wires is important. **The ideal length is 3/16 inch (5 mm)**.

- Longer bare wires can short together.
- Shorter wires are not as secure in the connectors and could be pulled out.

Alarm outputs connection

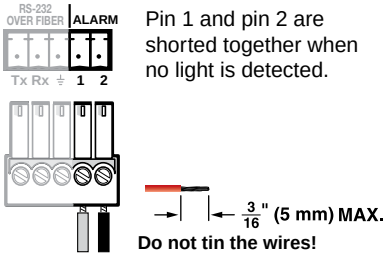

RS-232 OVER FIBER
ALARM
Tx Rx ⏚ 1 2
Pin 1 and pin 2 are shorted together when no light is detected.
3/16" (5 mm) MAX.
Do not tin the wires!

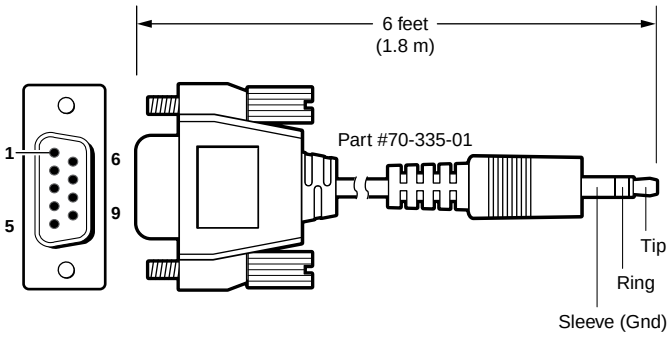
Figure 9. Alarm Connector

CAUTION: The length of the exposed (stripped) copper wires is important (see **Above**).

Front panel Configuration ports

NOTE: These ports are for remote control of the transmitter or receiver, not for the over fiber RS-232 link.

The Configuration ports on the transmitter and receiver are 2.5 mm mini stereo jacks. The 9-pin D to 2.5 mm mini jack TRS RS-232 cable, part **#70-335-01** (figure 10), included with transmitters, can be used for this connection.



9-pin D	Connection	TRS Plug
Pin 2	Computer's RX line	Tip
Pin 3	Computer's TX line	Ring
Pin 5	Computer's signal ground	Sleeve

Figure 10. 9-pin TRS RS-232 Cable

This port is RS-232 only, with the following protocols:

- 9600 baud
- no parity
- 8 data bits
- 1 stop bit
- no flow control

NOTE: The maximum distances from the transmitter or receiver to the controlling device can vary up to 200 feet (61 m). Factors such as cable gauge, baud rates, environment, and output levels (from the unit and the controlling device) all affect transmission distance. Distances of about 50 feet (15 m) are typically not a problem. In some cases, the unit may be capable of serial communications via RS-232 up to 250 feet (76 m) away.

See "**Remote Control**" for definitions of the SIS commands (serial commands to control the transmitter via this connector) and software control.

Power supply wiring

CAUTION: Always use power supplies specified by Extron for the FOXBOX units. Use of an unauthorized power supply voids all regulatory compliance certification and may cause damage to the supply and the unit.

Figure 11 shows how to wire the power connector.

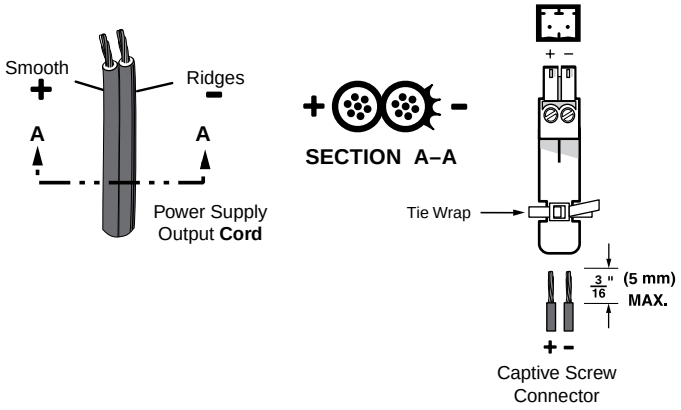


Figure 11. Power Connector Wiring

CAUTIONS: This product is intended to be supplied by a Listed Power Unit marked "Class 2" or "LPS," rated 12 VDC, 1.0 A minimum. Always use power supplies supplied by or specified by Extron. Use of an unauthorized power supply voids all regulatory compliance certification and may cause damage to the supply and the end product.

Unless otherwise stated, the AC/DC adapters are not suitable for use in air handling spaces or in wall cavities. The installation must always be in accordance with the applicable provisions of National Electrical Code ANSI/NFPA 70, article 75 and the Canadian Electrical Code part 1, section 16. The power supply shall not be permanently fixed to a building structure or similar structure.

Power supply voltage polarity is critical. Incorrect voltage polarity can damage the power supply and the unit. The ridges on the side of the cord (figure 11) identify the power cord negative lead.

To verify the polarity before connection, plug in the power supply with no load and check the output with a voltmeter.

WARNING: The two power cord wires must be kept separate while the power supply is plugged in. Remove power before wiring.

CAUTION: The length of the exposed (stripped) copper wires is important. **The ideal length is 3/16 inch (5 mm).** See the RS-232 Over Fiber connector **CAUTION** for more information.

NOTE: Do not tin the power supply leads before installing them in the captive screw connector. Tinned wires are not as secure in the connectors and could be pulled out.

Use the supplied tie wrap to strap the power cord to the extended tail of the connector.

Alternatively, an optional Extron PS 124 Universal 12 VDC Power Supply, part #**60-1022-01**, can power multiple Extron 12 VDC devices using only one AC power connector.

Operation

After the transmitter, all receivers, and their connected devices are powered up, the system is fully operational. If any problems are encountered, verify that the cables are routed and connected properly, and that all display devices have identical resolutions and refresh rates. If your problems persist, call the Extron S3 Sales & Technical Support Hotline. See the contact numbers on the last page of this guide for the Extron office nearest you.

To take advantage of the various adjustments and test patterns available in the FOXBOX, you need to connect a computer or other RS-232 capable device to the front panel Configuration port on either unit and operate using either SIS commands or the FOX Extenders Control Program (see "**Remote Control**").

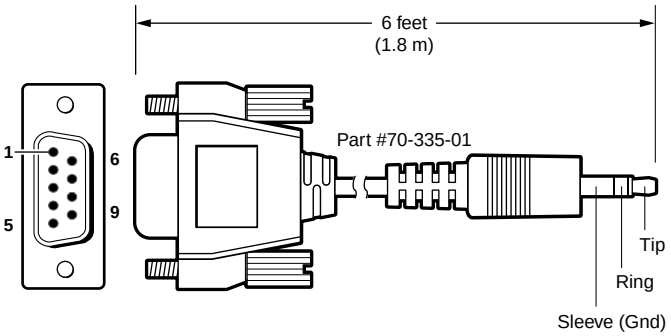
Remote Control

This section describes the remote control operation of the FOXBOX VGA, FOXBOX VGA/YUV, FOXBOX DVI Plus, and FOXBOX DVI, including:

- **Simple Instruction Set Control**
- **FOX Extenders Control Program**

The transmitter and receiver each have a Configuration port, a 2.5 mm mini stereo jack that can be connected to a host device such as a computer running the HyperTerminal utility, an RS-232 capable PDA, or a control system. These ports make serial control of the transmitter and receiver possible.

The Extron 9-pin D to 2.5 mm mini jack TRS RS-232 cable, included with the transmitter, but available separately, part #**70-335-01** (figure 12) can be used for connection to the Configuration port.



9-pin D	Connection	TRS Plug
Pin 2	Computer's RX line	Tip
Pin 3	Computer's TX line	Ring
Pin 5	Computer's signal ground	Sleeve

Figure 12. 9-pin TRS RS-232 Cable

The protocol for the ports is as follows:

- 9600 baud
- 1 stop bit
- no parity
- no flow control
- 8 data bits

NOTES: Only one fiber optic cable, transmitter-Tx-to-receiver-Rx, is required for video, audio, and serial command transmission. But, if you connect only one fiber optic cable, you will ***not*** receive RS-232 reports from the controlled device, and there will be ***reduced*** RS-232 command and control program functionality on the Rx unit. To receive responses from the controlled device and for full functionality, install both fiber optic cables and leave the FOXBOX receiver in normal configuration (Mode DIP switch 1 down on the receiver).

Simple Instruction Set Control

Host-to-Unit Instructions

SIS commands consist of one or more characters per field. No special characters are required to begin or end a command character sequence. When a command is valid, the unit executes the command and sends a response to the host device. All responses from the unit to the host end with a carriage return and a line feed (CR/LF = ↵), which signals the end of the response character string. A string is one or more characters.

Symbol Definitions

↵	= CR/LF (carriage return/line feed)		
←	= Carriage return (no line feed)		
•	= Space (hard) character		
Esc	= Escape key (hex 1B)		
X1	= Mute/auto memory status	0 = off	1 = on
X2	= Resolution	01 = 1920 x 1200 02 = 800 x 600 03 = 1024 x 768 04 = 1280 x 768 05 = 1280 x 1024 06 = 1365 x 768 07 = 1366 x 768 08 = 1400 x 1050 09 = 1600 x 1200 10 = 480p	11 = 576p 12 = 720p 13 = 1080i 14 = 1080p 15 = 640 x 480 16 = 1440 x 900 17 = 1280 x 800 18 = 1680 x 1050 19 = 1360 x 768
X3	= Refresh rate	1 = 50 Hz	2 = 60 Hz
X4	= Mode switch position	0 = off (down)	1 = on (up)
X5	= Output sync format	0 = RGBHV	1 = RGsB
X6	= Output sync polarity	0 = follows input	1 = force sync negative
X7	= Horizontal and vertical position	000 through 255	
X8	= Horizontal start	000 through 255	
X9	= Pixel phase	00 through 31	
X10	= Total pixels	± 255 of default value for selected resolution	
X11	= Sync frequency	*xxx.xx* (frequency in kHz [H] or Hz [V])	
X12	= Memory preset number	01 to 30	
X13	= Audio gain adjustment range	00 to 10	
X14	= Audio level adjustment range	–18 to +10 (in 1.0 dB steps)	
X15	= Audio attenuation adjustment range	00 to 18	
X16	= Audio output level	0 = consumer (–10 dBV)	1 = professional (+4 dBu)
X17	= Test pattern	0 = none 1 = color bars	2 = grayscale 3 = alternating pixels
X18	= Video shutdown interval	0 = 0 seconds (off) 1 = 0.25 second 2 = 0.5 second (default) 3 = 0.75 second	4 = 1 second 5 = 1.25 second 6 = 1.5 second
X19	= Rx link enable	0 = disable	1 = enable (default)
X20	= Link and input status	0 = link or input not sensed	1 link or input sensed
X21	= Transmission mode	SM = singlemode	MM = multimode
X22	= Transmitter or receiver	Tx = transmitter	Rx = receiver
X23	= Firmware version	*v.vv*	
X24	= Internal temperature	*nnn*F•*nn*C	

Unit-initiated Messages

When a local event, such as an equipment power-up, occurs, the unit responds by sending a message to the host. The unit-initiated messages are listed below:

(c) Copyright 2010, Extron Electronics FOXBOX Tx VGA, V*x.xx*, 60-934-*xx*↵↵

- or -

(c) Copyright 2010, Extron Electronics FOXBOX Rx VGA, V*x.xx*, 60-934-*xx*↵↵

- or -

(c) Copyright 2010, Extron Electronics FOXBOX Tx VGA/YUV, V*x.xx*, 60-1058-*xx*↵↵

- or -

(c) Copyright 2010, Extron Electronics FOXBOX Tx DVI, V*x.xx*, 60-935-*xx*↵↵

- or -

(c) Copyright 2010, Extron Electronics FOXBOX Rx DVI, V*x.xx*, 60-935-*xx*↵↵

- or -

(c) Copyright 2010, Extron Electronics FOXBOX Tx DVI Plus, V*x.xx*, 60-1060-*xx*↵↵

- or -

(c) Copyright 2010, Extron Electronics FOXBOX Rx DVI Plus, V*x.xx*, 60-1060-*xx*↵↵

The connected unit issues the appropriate copyright message (above) when it first powers on. V*x.xx* is the firmware version number; 60-*xxxx*-*xx* is the part number of the connected unit.

Reconfig↵

The unit sends the Reconfig message whenever the video input signal to the transmitter is changed.

1Lnk[X20]•2Lnk[X20]•RGB[X20]•Aud[X20]↵

The unit sends the status message whenever a change in the fiber link and video and audio connection occurs.

Dip[X4][X4]↵

The unit sends the DIP switch position message whenever a change in the DIP switch settings occurs on the receiver.

Error Responses

When the unit receives a valid SIS command, it executes the command and sends a response to the host device. If the unit is unable to execute the command because the command is invalid or it contains invalid parameters, the unit returns an error response to the host. The error response codes are:

E10 - Invalid command
E11 - Invalid preset number
E13 - Invalid parameter
E14 - Invalid command for this configuration

Using the Command/Response Tables

The command/response table begins on the next page. Either uppercase or lower case letters are acceptable in the command field except where indicated for the audio level (gain and attenuation) commands. Symbols are used throughout the table to represent variables in the command/response fields. Command and response examples are shown throughout the table. The ASCII to HEX conversion table below is for use with the command/response table.

ASCII to Hex Conversion Table

Space →	20	!	21	"	22	#	23	$	24	%	25	&	26	'	27
(	28	)	29	*	2A	+	2B	,	2C	-	2D	.	2E	/	2F
0	30	1	31	2	32	3	33	4	34	5	35	6	36	7	37
8	38	9	39	:	3A	;	3B	<	3C	=	3D	>	3E	?	3F
@	40	A	41	B	42	C	43	D	44	E	45	F	46	G	47
H	48	I	49	J	4A	K	4B	L	4C	M	4D	N	4E	O	4F
P	50	Q	51	R	52	S	53	T	54	U	55	V	56	W	57
X	58	Y	59	Z	5A	[	5B	\	5C	]	5D	^	5E	_	5F
`	60	a	61	b	62	c	63	d	64	e	65	f	66	g	67
h	68	i	69	j	6A	k	6B	l	6C	m	6D	n	6E	o	6F
p	70	q	71	r	72	s	73	t	74	u	75	v	76	w	77
x	78	y	79	z	7A	{	7B	|	7C	}	7D	~	7E	DEL	7F

Esc 1B CR 0D LF 0A

Command/Response Table for SIS Commands

Command	ASCII Command (host to unit)	Response (unit to host)	Additional description
Video mute			
Mute output	1B	Blk1↵	Blank the video output.
Unmute output	ØB	BlkØ↵	Output video.
Show video mute status	B	X1↵	Video mute status is X1.
Display Data Channel (DDC) resolution and rate (systems with DVI receivers only)			
NOTE: If the receiver is a FOX 500, the rear panel DDC Resol(ution) rotary switch on the transmitter must be in position 1 for the variables to be changeable via an SIS command. The unit returns the E14 error if the switch is in other than position 1.			
Set DDC resolution	41*X2*X3#	DDCX2*X3↵	Select a DDC Resolution.
Show DDC resolution	41#	X2*X3↵	Show the DDC resolution.
Mode switch position (systems with FOXBOX receivers only)			
Show DIP switch position	8#	X4X4↵	Show the FOXBOX receiver DIP switch position.
Output sync format			
Set output sync format	6*X5#	SynX5↵	Set the sync format.
Show output sync format	6#	X5↵	
Output sync polarity			
Set output polarity negative	7*1#	Pol1↵	Force the receiver output to always be negative.
Set polarity to the input	7*Ø#	PolØ↵	Polarity follows the video sync input to the transmitter.
Show output sync polarity	7#	X6↵	
Horizontal shift			
Set a horizontal position	X7H	HphX7↵	Set horizontal centering to X7.
Increment position	+H	HphX7↵	Shift the image one pixel to the right.
Decrement position	–H	HphX7↵	Shift the image one pixel to the left.
Show position	H	X7↵	
Vertical shift			
Set a vertical position	X7/	VphX7↵	Set vertical centering to X7.
Increment position	+/	VphX7↵	Shift the image down one line.
Decrement position	–/	VphX7↵	Shift the image up one line.
Show position	/	X7↵	
Horizontal start			
NOTE: When the controlling PC is connected to the receiver, the FOXBOX can perform this command only if the receiver-Tx-to-transmitter-Rx fiber cable is connected. The unit returns the E14 error if the Rx fiber is not connected.			
Set a start position	X8)	HstX8↵	Set the horizontal location of the first active pixel.
Example:	128)	Hst128↵	Set pixel 128 as the first active pixel.
Increment start position	+)	HstX8↵	Increase the horizontal start location value.
Decrement start position	–)	HstX8↵	Decrease the horizontal start location value.
Show start position	)	X8↵	

NOTE:

X1 = Mute status	0 = off	1 = on
X2 = Resolution	01 through 19. See page 20.	
X3 = Refresh rate	1 = 50 Hz	2 = 60 Hz
X4 = Mode switch position	0 = off (down)	1 = on (up)
X5 = Output sync format	0 = RGBHV	1 = RGsB
X6 = Output sync polarity	0 = follows input	1 = force sync negative
X7 = Horizontal and vertical position	000 through 255	
X8 = Horizontal start	000 through 255	

Command/response table for SIS commands (continued)

Command	ASCII Command (host to unit)	Response (unit to host)	Additional description
Pixel phase			
NOTE: When the controlling PC is connected to the receiver, the FOXBOX can perform this command only if the receiver-Tx-to-transmitter-Rx fiber cable is connected. The unit returns the E14 error if the Rx fiber is not connected.			
Set a pixel phase value	X9U	PhsX9↵	Set the pixel phase value to X9.
Example:	1ØU	Phs1Ø↵	Set the pixel phase value to 10.
Increment pixel phase	+U	PhsX9↵	Increase pixel phase value by 1.
Decrement pixel phase	–U	PhsX9↵	Decrease pixel phase value by 1.
Show pixel phase	U	X9↵	
Total pixels			
NOTE: When the controlling PC is connected to the receiver, the FOXBOX can perform this command only if the receiver-Tx-to-transmitter-Rx fiber cable is connected. The unit returns the E14 error if the Rx fiber is not connected.			
Set a total pixel value	11*X10#	TpxX10↵	Set the total pixels to a specific value.
Example:	11*1555#	Tpx1555↵	Set the total pixel value to 1555.
Increment total pixel value	+11#	TpxX10↵	Increase total pixels by 1 pixel.
Decrement total pixel value	–11#	TpxX10↵	Decrease total pixels by 1 pixel.
Show total pixel value	11#	TpxX10↵	
List sync frequency			
View input frequency	1LS	X11horozontal,X11vertical↵	List the input frequency.
Memory presets			
Save preset	X12,	SprX12↵	Command code is a comma.
Recall preset	X12.	RprX12↵	Command code is a period.
Audio input gain and attenuation			
NOTES: • The set gain (G) and set attenuation (g) commands **are** case sensitive. The increment level, decrement level, and show level **are not** case sensitive. • When the controlling PC is connected to the receiver, the FOXBOX can perform this command only if the receiver-Tx-to-transmitter-Rx fiber cable is connected. The unit returns the E14 error if the Rx fiber is not connected.			
Set input audio gain to a +dB value	X13G	AudX14↵	Set the input level (gain) to +X13 dB.
Example:	2G	Aud+Ø2↵	Set the input level (gain) to +2 dB.
Set input audio attenuation to a -dB value	X15g	AudX14↵	Set the input level (attenuation) to –X13 dB.
Increment input level	+G	AudX14↵	Increase the audio level by 1 dB.
Example:	+G	Aud+Ø3↵	Increment the input level from +2 dB to +3 dB.
Decrement input level	–G	Aud–Ø1↵	Decrease the audio level from 0 dB to –1 dB.
Show input level	G	X14↵	
Audio output level			
NOTE: The FOXBOX receiver outputs audio at the consumer level (-10 dBV) only. The FOX 500 or PowerCage FOX can be configured to output audio at the professional level; refer to the applicable User Guide.			
Set the output to the consumer level	4Ø*Ø#	Lvl0↵	Set the audio output to the consumer level (–10 dBV).
Set the output to the professional level	4Ø*1	Lvl1↵	Set the audio output to the professional level (+4 dBu).
Show output level	4Ø#	X16↵	Show the audio output level.

NOTE:	X9 = Pixel phase	00 to 31	
	X10 = Total pixels	± 255 of default value for selected resolution	
	X11 = Sync frequency	*xxx.xx* (frequency in kHz [H] or Hz [V])	
	X12 = Memory preset number	01 to 30	
	X13 = Audio gain adjustment range	00 to 10	
	X14 = Audio level adjustment range	-18 to +10 (in 1.0 dB steps)	
	X15 = Audio attenuation adjustment range	00 to 18	
	X16 = Audio output level	0 = consumer (–10 dBV)	1 = professional (+4 dBu)

Command/response table for SIS commands (continued)

Command	ASCII Command (host to unit)	Response (unit to host)	Additional description
Audio mute			
Mute the audio	1Z	Amt1↵	Silence the audio output of the receiver.
Unmute the audio	ØZ	AmtØ↵	The receiver outputs audio.
Show audio mute statue	Z	X1↵	Audio mute status is X1.
Auto memory			
Disable auto memory	55*Ø#	ImgØ↵	
Enable auto memory	55*1#	Img1↵	
Show auto memory status	55#	X1↵	
Auto Image™			
Trigger Auto Image	55*2#	Img↵	
Test pattern			
NOTE: You must have a video input connected and the transmitter-Tx-to-receiver-Rx fiber cable connected for the receiver to output a selected test pattern. The test pattern turns off if the input signal rate changes or is disconnected or if power is removed.			
Output color bars	1J	Tst1↵	Set the receiver to output the color bars test pattern.
Output grayscale	2J	Tst2↵	Set the receiver to output the grayscale test pattern.
Output alternating pixels	3J	Tst3↵	Set the receiver to output the alternating pixels test pattern.
Turn test pattern off	ØJ	Tst4↵	Set the receiver to output the input video (no test pattern is selected).
Show test pattern status	J	X17↵	
Disable and enable return link			
NOTE: The disable return link function is primarily used and recommended when the transmitting device is a FOX 500 DA6 and the receiver is connect to any of outputs 2 through 6 on the DA.			
Disable return link	66*Ø*Ø#	Rle*Ø*Ø↵	Disable link 2.
Enable return link to transmitter	66*Ø*1#	Rle*Ø*1↵	Enable link 2 (default setting).
Show return link status	66*Ø#	Ø*X16↵	
Video shutdown delay			
NOTES: • This command mutes the output for a variable period of time when the unit detects a change in the input pixel clock. 0.5 second is the default. This feature can prevent glitches when the input video signal resolution changes. • Front panel DIP switch 2 must be on (up) for this command to function.			
Enable video shutdown	3*X18#	Dly X18↵	Mute the output for an interval of X18.
Example:	3*3#	Dly3↵	Mute the output for 0.75 second.
View video shutdown	3#	X18↵	The video shutdown interval is X18.

NOTE:

X1 = Mute and auto memory status — 0 = off, 1 = on

X17 = Test pattern — 0 = none, 1 = color bars, 2 = grayscale, 3 = alternating pixels

X19 = Rx link — 0 = disable, 1 = return link enable

X18 = Video shutdown interval — 0 = 0 sec. (off), 1 = 0.25 sec., 2 = 0.5 sec., 3 = 0.75 sec., 4 = 1 sec., 5 = 1.25 sec., 6 = 1.5 sec.

Command/response table for SIS commands (continued)

Command	ASCII Command (host to unit)	Response (unit to host)	Additional description
Information requests			
Information request	I	1Lnk[X20]•2Lnk[X20]•RGB[X20]•Aud[X20]•[X21]•[X22]↵	The unit responds with the current status (signal detected) of optical link 1, optical link 2, the video input, and the audio link; the fiber optic transmission mode (singlemode or multimode); and the device type (Tx or Rx).
NOTE: The receiver monitors the primary (transmitter-TX to receiver-Rx) fiber cable. If the PC is connected to the transmitter and the receiver-Tx-to-transmitter-Rx fiber cable is not connected, for the **I** and **1S** commands, the transmitter reports `1link0` regardless of the status of the primary cable.			
Show firmware version	Q	[X23]↵	
Example:	Q	1.23↵	The factory-installed firmware version is 1.23 (sample value only).
Request part number	N	60-*nnn*-*nn*↵	See "**Part Numbers**."
Request part number of other unit	1N	60-*nnn*-*nn*↵	See "**Part Numbers**."
Show link 1 status	1S	[X20]↵	Light status on transmitter-Tx-to-receiver-Rx cable.
Show link 2 status	2S	[X20]↵	Light status on receiver-Tx-to-transmitter-Rx cable.
Show input video status	3S	[X20]↵	Show transmitter video input status.
Show input audio status	4S	[X20]↵	Show transmitter audio input status.
Show temperature	2ØS	[X24]↵	Show temperature in degrees Fahrenheit and Celsius.
Resets			
Reset audio	EZA←	Zpa↵	Reset audio setting to default levels (0 dB gain).
Reset memory presets	EZG←	Zpg↵	Reset (erase) all memory presets.
System reset	EZXXX←	Zpx↵	Reset all settings to factory defaults.

NOTE:

[X20] = Link or input status	0 = light or signal input not detected 1 = light or signal detected	
[X21] = Transmission mode	SM = singlemode	MM = multimode
[X22] = Transmitter or receiver	Tx = transmitter	Rx = receiver
[X23] = Firmware version	*v.vv*	
[X24] = Internal temperature	*nnn*F•*nn*C	

FOX Extenders Control Program

The Extron FOX Extenders Control Program, which communicates with the transmitter and receiver pair via the Remote RS-232 port of either unit provides an easy way to operate the pair.

The program is compatible with Windows 2000, Windows XP, or later. Updates to this program can be downloaded from the Extron website (**www.extron.com**).

Installing the Software

The program is contained on a DVD. To install the software, insert the DVD into the drive. The Extron software DVD window should appear automatically. If it does not self-start, run Launch.exe from the DVD. Click the Software tab, scroll to the desired program, and click **Install**. Follow the instructions that appear on the screen. By default, the installation creates a C:\Program Files\Extron\FOX_Extenders directory, and it places four icons into a group folder named "Extron Electronics\FOX Extenders." The four installed icons are:

- Check for FOX Extenders updates
- FOX Extenders
- FOX Extenders Help
- Uninstall FOX Extenders

Starting the Program

Start the Extron FOX Extenders Control program as follows:

1. Click **Start** > **All Programs** > **Extron Electronics** > **FOX Extenders Control Program** > **FOX Extenders**.

   The Communication Setup window appears (figure 13).

Figure 13. Communication Setup Window

2. Select the Com port to which your transmitter or receiver is connected. Click **OK**.
   The FOX Extenders Control Program window appears (figure 14).

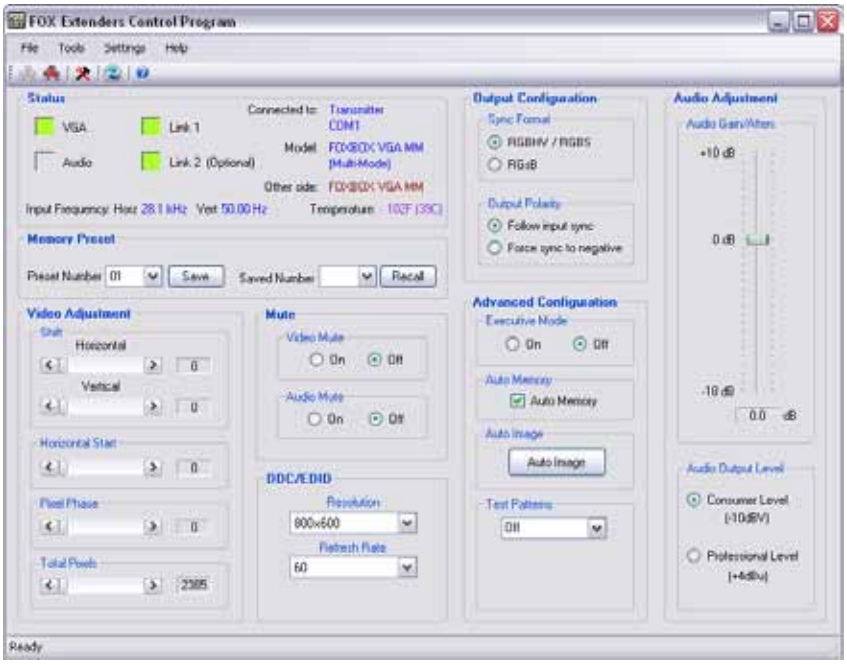


Figure 14. FOX Extenders Control Program Window

NOTE: Only one fiber optic cable, transmitter-Tx-to-receiver-Rx, is required for serial command transmission. But, if you connect only one fiber optic cable, there will be ***reduced*** control program functionality on the Rx unit. For full functionality, install both fiber optic cables and leave the FOXBOX receiver in normal mode (Mode DIP switch 1 down).

Status area

The status area provides visual indications of the connection status.

- **RGB indicator —** This indicator is green when the transmitter detects a sync signal on its video input:
  - Horizontal sync (H) (for RGBHV video)
  - Composite sync (S) (for RGBS video)
  - Green (Sync on green) (G) (for RGsB or RsGsBs video) or YUV
  - DVI video
- **Audio indicator —** This indicator is green when the transmitter detects a low level audio signal for a short period. This indicator goes dark if the audio signal drops below the minimum threshold for a short period.
- **Link 1 indicator —** This indicator is green when the receiver detects light on the fiber optic cable connected to the Tx port.

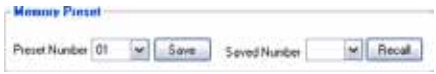
> **NOTE:** The receiver detects the transmitter-Tx-to-receiver-Rx light. It reports the status to the transmitter via the optional Rx cable.
>
> If the PC is connected to the transmitter **and** *either* the secondary (receiver-Tx-to-transmitter-Rx) cable is not connected in your system *or* the receiver is in the daisy chain mode, the Link 1 indicator in the control program does not show green (detected), whether the receiver detects the link or not.

- **Link 2 (Optional) indicator —** This indicator is green when the transmitter detects light on the fiber optic cable connected to the Rx port.

> **NOTE:** The transmitter detects the receiver-Tx-to-transmitter-Rx light. It reports the status to the receiver via the Tx cable.
>
> If the PC is connected to the receiver **and** *either* the primary (transmitter-Tx-to-receiver-Rx) cable is disconnected *or* the receiver is in the daisy chain mode, the Link 2 indicator in the control program will not show green (detected), whether the transmitter detects the link or not.

The Status area also shows to which unit the controlling PC is connected, the FOXBOX model (multimode or singlemode), the internal temperature, the daisy chain mode, and the video input frequency. The "Other Side" entry is the device connected to the far end of the fiber optic cable.

Memory Preset area



The Memory Preset area provides a means to save and recall memory presets. Memory presets are stored values of the horizontal and vertical position and sizing information saved in nonvolatile memory. When the FOXBOX is powered down and later powered back up, the settings are available for selection using the **`Recall`** button. Saving the settings to a preset using the **`Save`** button overwrites the settings previously written to that preset.

Mute area

Click the **`Video Mute`** radio button, the **`Audio Mute`** radio button, or both in the Mute area to turn the video and audio mutes on and off.

NOTES:

- When the video output is RGB and the output is muted, the receiver mutes the red, green, and blue planes, but leaves the sync plane(s) (horizontal and vertical or composite sync) live so that there is no loss of sync in the display device.
- When you mute or unmute the output, the setting is changed in the receiver. It reports the changes to the transmitter via the optional receiver-Tx-to-transmitter-Rx cable.
  If you are connected to the transmitter **and** *either* the receiver-Tx-to-transmitter-Rx cable is not connected in your system *or* the receiver is in the daisy chain mode, you can still mute the output in the Mute area, but the program cannot report the position values. The `Set video` (or `audio`) `mute On` or `Off` message is displayed for approximately 1 second (figure 15).

Figure 15. Alternate Mute Area Indication

DDC/EDID Resolution area

The DDC/EDID Resolution area provides drop-down boxes that let you manually set the DDC/EDID resolution and refresh rate.

Video Adjustment area

The Video Adjustment area provides slider controls that let you change the following video parameters:

- Shift Horizontal (position)
- Shift Vertical (position)
- Horizontal Start
- Pixel Phase
- Total Pixels

NOTES:

- When you make changes to the horizontal start, pixel phase, or total pixels settings, the value is changed in the transmitter.
- If the PC is connected to the receiver **and** *either* the receiver-Tx-to-transmitter-Rx cable is not connected in your system *or* the receiver is in the daisy chain mode, you cannot change these values using the control program. These slider controls are unavailable.
- When you make horizontal or vertical position changes (shift the image), the setting is changed in the receiver. It reports the shift values to the transmitter via the optional receiver-Tx-to-transmitter-Rx cable.
  If the PC is connected to the transmitter **and** *either* the receiver-Tx-to-transmitter-Rx cable is not connected in your system *or* the receiver is in the daisy chain mode, you can still shift the image in the Video Adjustment area, but the program cannot report the position values.

Output Configuration area

Sync Format radio buttons — The FOXBOX receiver outputs RGBHV or RGsB video (depending on the input to the transmitter) only. The radio buttons in this area have no effect on the FOXBOX receiver. See the *FOX 500 User Guide* or the *PowerCage FOX User Guide* if you are using one of those products to receive the fiber optic signal, as the video output of those products can be configured.

Output Polarity radio buttons — Click either the **`Follow input sync`** or **`Force sync to negative`** radio button to select the desired video output sync polarity.

NOTE: When you make output configuration changes, the setting is changed in the receiver. It reports the changes to the transmitter via the optional receiver-Tx-to-transmitter-Rx cable.

If the PC is connected to the transmitter **and** *either* the receiver-Tx-to-transmitter-Rx cable is not connected in your system *or* the receiver is in the daisy chain mode, the program cannot report the output sync format and polarity position settings in the Video Adjustment area. You can change the output sync format and polarity, but the program cannot report the changes.

Advanced Configuration area

Executive Mode buttons — The **`Executive Mode`** radio buttons have no effect on the operation of the FOXBOX units.

Auto Memory checkbox — Click the **`Auto Memory`** checkbox to automatically apply saved position, horizontal start, total pixels, and pixel phase settings when the sensed input resolution changes.

Auto Image button — Click the **`Auto Image`** button to adjust the output settings for the best image, based on the sensed input resolution.

Test Patterns drop box — Select one of three built-in test patterns; **`color bars`**, **`grayscale`**, and **`alternating pixels`**; as necessary to help adjust the color, brightness/contrast, and focus of the display. Select **`Off`** to output the video input to the transmitter.

NOTE: You must have a video input connected and the transmitter-Tx-to-receiver-Rx fiber cable connected and the receiver must be in the normal mode for the receiver to output a selected test pattern.

The test pattern turns off if the input signal rate is changed or disconnected or if power is removed.

Audio Adjustment area

Audio Gain/Attenuation slider — Click and drag the **`Audio Gain/ Attenuation`** slider control to select the input audio gain or attenuation value, from -18 dB to +10 dB in 1.0 dB increments.

NOTE: When you make input gain or attenuation changes, the setting is changed in the transmitter.
If the PC is connected to the receiver **and** *either* the receiver-Tx-to-transmitter-Rx cable is not connected in your system *or* the receiver is in the daisy chain mode, you cannot change the input value from the Audio Adjustment area.

Audio Output Level radio buttons — Click either the **`Consumer Level`** (-10 dBV) or **`Professional Level`** (+4 dBu) radio button to select the output audio level.

NOTE: When you make an audio output level change, the setting is changed in the receiver. It reports the changes to the transmitter via the optional receiver-Tx-to-transmitter-Rx cable.
If the PC is connected to the transmitter **and** *either* the receiver-Tx-to-transmitter-Rx cable is not connected in your system *or* the receiver is in the daisy chain mode, the program cannot report the output audio level in the Audio Adjustment area. You can change the level, but the program cannot report the changes. The program shows the `Set Consumer` (or `Set Professional`) level message to indicate that the output level command is control only, not an indication (figure 16). The message is displayed for approximately 1 second.

Figure 16. Alternate Audio Adjustment Area Indication

Firmware upgrade

Firmware can be upgraded for each unit via the front panel Configuration port on that unit using the Extron Firmware Loader utility from the FOX Extender Control Program.

NOTES:
- When firmware upgrades are available, they are unique to the unit:
  - A unique transmitter firmware upgrade for the Tx unit
  - A unique receiver firmware upgrade for the Rx unit.
- Your PC must be connected directly to the unit for the firmware to be updated.

Downloading the firmware from the website

To obtain the latest version of firmware for your FOXBOX unit:

1. Visit the Extron website, www.extron.com, click the **Download** tab, and then click the **Firmware** link on the left sidebar menu (figure 17).

Figure 17. Location of Firmware Upgrade Files

2. On the Download Center screen (figure 18), click the links for the appropriate firmware file or files.

NOTE: There are different files for transmitters (Txs) and receivers (Rxs) and for VGA and DVI units.

Figure 18. FOXBOX Firmware

3. Complete the Personal Information form (figure 19) and click the **Download** button.

Figure 19. Personal Information Form

4. Follow the instructions on the rest of the download screens to download the firmware update from the Extron website, start the Extron Installation Program to extract the firmware file, and place it in a folder identified in the program window.

NOTE: Note the folder to which the firmware file is saved (figure 20).

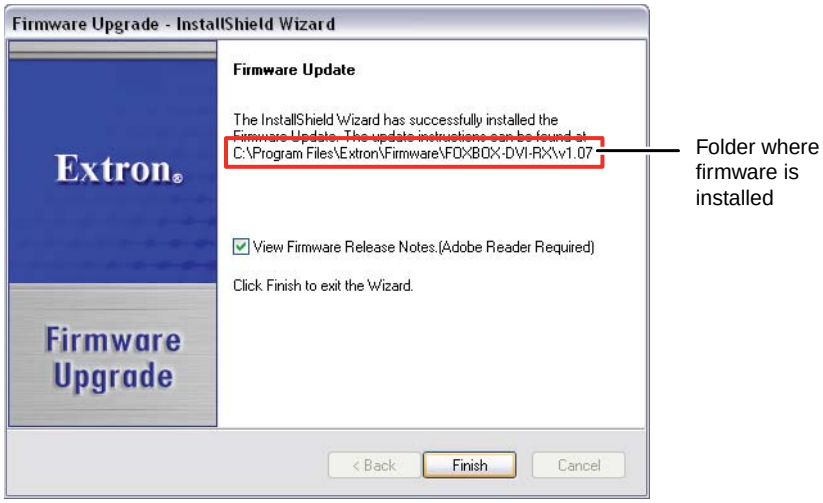


Figure 20. Location of the Firmware File

Loading the firmware to the transmitter and receiver

To load a new version of firmware to your transmitter and receiver, call the Firmware Loader software from within the FOX Extenders program. The serial port on your computer must be connected to the Configuration port on the unit that is having its firmware updated (see "**Front panel Configuration ports**" for more information.

1. In the FOX Extenders Control Program, click the Firmware Loader button ( ) on the tool bar.

NOTE: If the Firmware Loader button does not appear on the tool bar, the Firmware Loader software is not installed. Install it as follows:

- **a.** On the Extron website, click the **Download** tab.
- **b.** On the Download Center page, click **Software** on the left sidebar menu.
- **c.** Locate the "Firmware Loader" line and click the **Download** link at the far right.
- **d.** Follow the instructions on the download screens to save the installer file to your computer.
- **e.** In Windows Explorer or another file browser, locate the Firmware Loader executable file in the file system on your computer and double-click it to open it.
- **f.** Follow the instructions on the Installation Wizard screens to install the Firmware Loader on your computer. Unless you specify otherwise, the installer program places the Firmware Loader file, "FWLoader.exe" in C:\Program Files\Extron\FWLoader.

  If the Extron and FWLoader folders do not yet exist in your Program Files folder, the installer creates them.

2. If you have not previously updated firmware for the FOXBOX unit before, on the Add Device screen (figure 21), select the **RS-232** tab.

   If you have previously updated firmware for this model, click **Cancel**. The Firmware Loader window appears. Proceed to step **5**.

NOTES:
- Although the screen also has a TCP/IP tab, the FOXBOX unit does not have a LAN port. Do not select the TCP/IP tab.
- Figure 21 shows the default values.

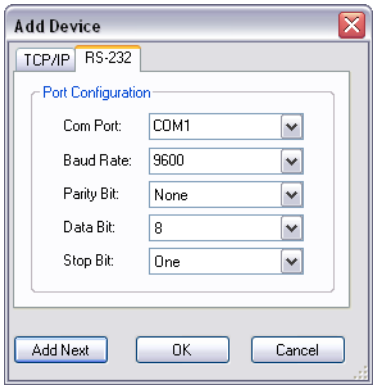


Figure 21. Add Device Screen

3. From the drop-down menus on the RS-232 screen, select the appropriate Com port number and baud rate (the default is 9600).
4. Click **OK**. The Firmware Loader window appears (figure 22).

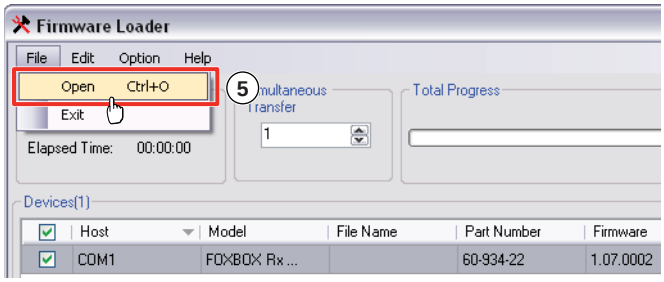


Figure 22. Extron Firmware Loader Window

5. Select the FOXBOX unit and click **File** > **Open**. The Choose Firmware File screen appears (figure 23).

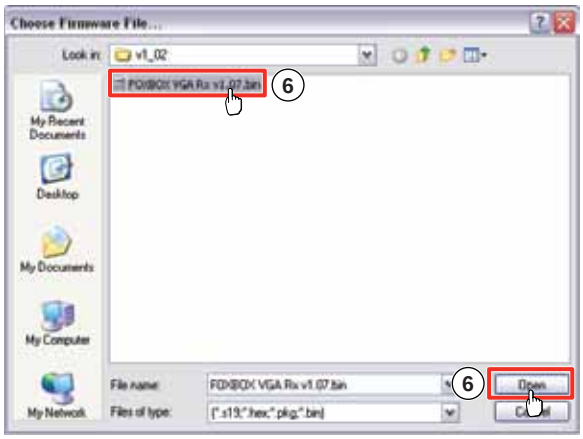


Figure 23. Choose Firmware File Window

6. Navigate to and select the new firmware file. Click **Open**. The Choose Firmware File window closes.

> **NOTE:** When downloaded from the Extron website, the firmware is placed in a subfolder of `C: \Program Files\Extron\Firmware`.

> **CAUTION:** The firmware file must have a .bin extension. Other file types can cause the unit to stop functioning.

7. In the Firmware Loader window, click **Begin** (figure 24).

   The Total Progress and Progress status bars show the progress of the upload. The firmware upload to the unit may take several minutes. Once the status bars have progressed from 0% to 100%, and Status is listed as Completed, the firmware loader utility resets the unit.

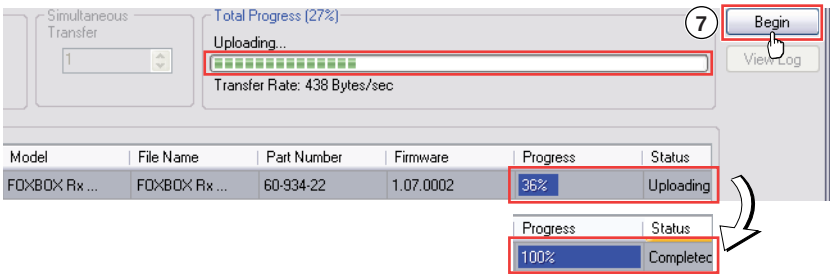


Figure 24. Firmware Loader Screen

8. Click **Exit** to close the Firmware Loader.

Reference Information

This section discusses the specifications, part numbers, and accessories for the FOXBOX Tx/Rx. Topics that are covered, include:

- **Specifications**
- **Part Numbers**
- **Mounting the Transmitter and Receiver**

Specifications

NOTES:
- The FOXBOX consists of a transmitter (FOXBOX Tx DVI, DVI Plus, VGA, or VGA/YUV) and a receiver (FOXBOX Rx DVI, DVI Plus, or VGA) with one or two fiber optic cables linking the two units. They are available in singlemode or multimode versions.
- The FOXBOX Tx DVI Plus transmitter is compatible only with the FOXBOX Rx DVI Plus receiver.
- For the VGA models, the analog RGB input signal is digitized pixel for pixel in the transmitter, sent digitally through the fiber cable, and converted back to analog RGB in the receiver.
- The analog audio signal(s) is (are) digitized in the transmitter, sent through the fiber cable, and converted back to analog audio in the receiver.
- These transceivers are class 1 laser products. They meet the safety regulations of IEC-60825, FDA 21, CFR 1040.10, and FDA 21 CFR 1040.11.

Optical fiber interconnection between transmitter and receiver

Number/type ..... 1 or 2 fiber optic

NOTE: Only one fiber is required to transmit video, audio, and unidirectional data. A second fiber is required to transmit return data for bidirectional control/communication.

Connectors ..... 2 LC connectors

Operating distance

- Singlemode ..... 30 km (18.75 miles) with singlemode (SM) cables with a FOXBOX SM
- Multimode ..... 300 m (985') with 62.5 µm multimode (MM) cables with a FOXBOX MM
  1 km (3280') with 50 µm multimode (MM) cables with a FOXBOX MM
  2 km (6561') with 50 µm 2000 MHz bandwidth laser optimized multimode cable with a FOXBOX MM

NOTE: Operating distance is approximate. These are typical maximum distances that may vary depending on factors such as fiber type, fiber bandwidth, connector splicing, losses, modal or chromatic dispersion, environmental factors, and kinks.

Nominal peak wavelength ..... 850 nm for FOXBOX MM, 1310 nm for FOXBOX SM

Data rate ..... 4.25 Gbps

Transmission power

- Singlemode ..... -5 dBm, typical
- Multimode ..... -5 dBm, typical

Maximum receiver sensitivity

Singlemode	-18 dBm, typical
Multimode	-12 dBm, typical

Optical loss budget

Singlemode	13 dB, maximum
Multimode	7 dB, maximum

Video — FOXBOX Tx/Rx VGA and FOXBOX Tx VGA/YUV

Signal type	
VGA models	VGA-UXGA RGBHV, RGBS, RGsB, RsGsBs
VGA/YUV models	VGA-UXGA RGBHV, RGBS, component video
Gain	Unity
Pixel data bit depth	8 bits per channel, 3 channels (R, G, B; or YUV)
Maximum resolution	1600x1200 or 1080p @ 60 Hz, digitized pixel for pixel; higher resolutions up to 2048x1120, undersampled

Video input — FOXBOX Tx VGA and FOXBOX Tx VGA/YUV

Number/signal type	
VGA models	1 VGA-UXGA RGBHV, RGBS, RGsB, RsGsBs
VGA/YUV models	1 VGA-UXGA RGBHV, RGBS, component video (bi- or tri-level YUV, 480p, 576p, 720p, 1080i, 1080p)
Connectors	1 female 15-pin HD
Nominal level	1 Vp-p for Y of component video 0.7 Vp-p for RGB and for R-Y and B-Y of component video
Minimum/maximum levels	Analog: 0.3 V to 0.75 Vp-p with no offset, terminated
Impedance	75 ohms
Horizontal frequency	24 kHz to 100 kHz
Vertical frequency	40 Hz to 120 Hz
Return loss	<-40 dB @ 5 MHz

Video output — FOXBOX Rx VGA

Number/signal type	With input from a FOXBOX Tx VGA or a FOX 500 Tx: 1 VGA-UXGA RGBHV, RGsB (follows input or can be set by user) With input from a FOXBOX Tx VGA/YUV: 1 VGA-UXGA RGBHV, RGBS, component video (bi- or tri-level YUV, 480p, 576p, 720p, 1080i, 1080p)
Connectors	1 female 15-pin HD
Nominal level	1 Vp-p for Y of component video 0.7 Vp-p for RGB and for R-Y and B-Y of component video
Minimum/maximum levels	0.3 V to 0.75 Vp-p, terminated
Impedance	75 ohms
Return loss	-30 dB @ 5 MHz
DC offset	±5 mV with input at 0 offset
Video delay	1-2 frames

Sync — FOXBOX Tx/Rx VGA and FOXBOX Tx VGA/YUV

Input type	
VGA model	RGBHV, RGBS, RGsB, RsGsBs
VGA/YUV model	RGBHV, RGBS, component video (bi- or tri-level sync)
Output type	
VGA model	RGBHV, RGsB (follows input or can be set by user)
VGA/YUV model	Output via a FOXBOX Rx VGA or a FOX 500 Rx: RGBHV, component video (bi- or tri-level)
Input level	2.5 V to 5.0 Vp-p
Output level	TTL: 5.0 Vp-p, unterminated, on HV, for RGBHV, RGBS 0.3 Vp-p for component video (bi-level sync, unterminated) or for Gs (SOG), terminated 0.6 Vp-p for component video (tri-level sync)
Input impedance	10k ohms

Output impedance ..... 75 ohms
Polarity..... Positive or negative (follows input or can be set by user)

Video — FOXBOX Tx/Rx DVI, FOXBOX Tx/Rx DVI Plus

NOTE: *Appropriate DVI-D to HDMI cables or adapters are required for HDMI signal input/output.
The FOXBOX DVI Series and FOXBOX DVI Plus Series can be used to distribute HDMI signals if you use a DVI-to-HDMI adapter. However, when using HDMI signals, these units do not transmit audio and CEC signals. The FOXBOX DVI and FOXBOX DVI Plus do not support transmission of DVI signals with High-bandwidth Digital Content Protection (HDCP).

Resolution range
- DVI models..... Up to 1600x1200 or 1080p @ 60 Hz pixel for pixel; higher resolutions up to 1920x1200 @ 60 Hz, undersampled
- DVI Plus models..... Up to 1920x1200 or 1080p @ 60 Hz pixel for pixel

Formats..... RGB and YCbCr digital video
Standards..... DVI 1.0, HDMI 1.2

Video input — FOXBOX Tx DVI, FOXBOX Tx DVI Plus

Number/signal type ..... 1 single link DVI-D (or HDMI*)
Connectors ..... 1 female DVI-I

Video output — FOXBOX Rx DVI, FOXBOX Rx DVI Plus

Number/signal type ..... 1 single link DVI-D (or HDMI*)
Connectors ..... 1 female DVI-I
Nominal level ..... 0.8 Vp-p
Video delay ..... 1-2 frames

Audio

Gain
- Range..... Adjustable, -18 dB to +10 dB
- Default..... Unbalanced output: 0 dB

Frequency response..... 20 Hz to 20 kHz, ±0.5 dB
THD + Noise..... 0.10% @ 1 kHz at nominal level
S/N..... >80 dB at maximum output (unweighted)
CMRR ..... 65 dB @ 20 Hz to 20 kHz
Audio bits per sample..... 18 bits per channel, 2 channels (L, R)
Sampling rate..... 48 kHz

Audio input — transmitters (Tx units)

Number/signal type ..... 1 unbalanced stereo or 2 unbalanced mono
Connectors ..... (1) 3.5 mm mini stereo jack
Impedance ..... 18k ohms unbalanced, DC coupled
Nominal level ..... -10 dBV (316 mVrms)
Maximum level..... +8.9 dBV, (unbalanced) at 1% THD+N

NOTE: 0 dBu = 0.775 Vrms, 0 dBV = 1 Vrms, 0 dBV ≈ 2 dBu

Audio output — receivers (Rx units)

Number/signal type ..... 1 unbalanced stereo or 2 unbalanced mono
Connectors ..... (1) 3.5 mm mini stereo jack
Impedance ..... 50 ohms unbalanced
Nominal level ..... -10 dBV (316 mVrms)
Maximum level (Hi-Z)..... +7.6 dBu, unbalanced at 1% THD+N
Maximum level (600 ohm)..... >+6.3 dBu, unbalanced at 1% THD+N
Audio delay..... 1.5 frames

Control/remote

Serial control ports on each unit (transmitter and receiver)

Control	1 RS-232, 2.5 mm mini stereo jack (front panel)
Pass-through	1 RS-232, 3.5 mm captive screw connector, 5 pole (3 pins are used) (rear panel)

Baud rate and protocol

Control	9600 baud, 8 data bits, 1 stop bit, no parity
Pass-through	9600 to 115,200 baud
Serial control pin configuration	Mini stereo jack: tip = Tx, ring = Rx, sleeve = GND
Program control	Extron control/configuration program for Windows® Extron Simple Instruction Set™ (SIS™)

General

External power supply	100 VAC to 240 VAC, 50-60 Hz, external; to 12 VDC, 1 A, regulated
Power input requirements	12 VDC, 0.6 A
Temperature/humidity	Storage: -40 to +158 °F (-40 to +70 °C) / 10% to 90%, noncondensing Operating: +32 to +122 °F (0 to +50 °C) / 10% to 90%, noncondensing
Cooling	Convection, vents on top and side panels

Thermal dissipation, full load

Transmitters	
115 VAC, 60 Hz	DVI model: 7.7 BTU/hr DVI Plus model: 2.9 BTU/hr VGA model: 7.8 BTU/hr
240 VAC, 50 Hz	DVI model: 11.0 BTU/hr DVI Plus model: 4.0 BTU/hr VGA model: 11.4 BTU/hr
Receivers	
115 VAC, 60 Hz	DVI model: 7.2 BTU/hr DVI Plus model: 2.7 BTU/hr VGA model: 8.0 BTU/hr
240 VAC, 50 Hz	DVI model: 10.5 BTU/hr DVI Plus model: 3.9 BTU/hr VGA model: 10.9 BTU/hr

Mounting

Rack mount	Yes, with optional rack shelf
Furniture mount	Yes, with optional under desk mounting kit
Enclosure type	Metal
Enclosure dimensions	1.0" H x 4.3" W x 6.0" D (quarter rack wide) (2.5 cm H x 10.9 cm W x 15.2 cm D) (Depth excludes connectors.)
Product weight	0.7 lbs (0.3 kg) per unit, 1.4 lbs (0.6 kg) per pair
Shipping weight	3 lbs (2 kg) per unit, 6 lbs (3 kg) per pair
Vibration	ISTA 1A in carton (International Safe Transit Association)

Regulatory compliance

Safety	CE, c-UL, FDA Class 1, UL
EMI/EMC	CE, C-tick, FCC Class A, ICES, VCCI
MTBF	30,000 hours

Warranty 3 years parts and labor

NOTE: All nominal levels are at ±10%.
NOTE: Specifications are subject to change without notice.

Part Numbers

FOXBOX Tx/Rx Part Numbers

The FOXBOX units are available in singlemode (SM) and multimode (MM) models:

FOX Tx/Rx Enclosure and Boards	Part number
FOXBOX Tx VGA SM	60-934-12
FOXBOX Rx VGA SM	60-934-22
FOXBOX Tx VGA/YUV SM	60-1058-12
FOXBOX Tx VGA MM	60-934-11
FOXBOX Rx VGA MM	60-934-21
FOXBOX Tx VGA/YUV MM	60-1058-11
FOXBOX Tx DVI SM	60-935-12
FOXBOX Rx DVI SM	60-935-22
FOXBOX Tx DVI Plus SM	60-1060-12
FOXBOX Rx DVI Plus SM	60-1060-22
FOXBOX Tx DVI MM	60-935-11
FOXBOX Rx DVI MM	60-935-21
FOXBOX Tx DVI Plus MM	60-1060-11
FOXBOX Rx DVI Plus MM	60-1060-21

Included parts

These items are included in each order for a FOXBOX Tx/Rx:

Included parts	Part number
IEC power cord	
Tweeker (small screwdriver)	
Setup guide	
Captive screw 5-pole connectors (qty. 6)	10-703-12
Extron Software Products DVD (FOX Extenders Control Program)	
9-pin D to 2.5 mm mini jack TRS RS-232 cable (with transmitter only)	70-335-01
(2) 10' LC-LC duplex patch cables (SM or MM, depending on the model)	

Mounting Accessories

Mounting Kit	Part Number
RSU 126 6-inch deep 1U universal rack shelf kit	60-190-10
RSB 126 6-inch deep 1U basic rack shelf	60-604-11
RSU 129 9.5-inch deep 1U universal rack shelf kit	60-190-01
RSB 129 9.5-inch deep 1U basic rack shelf	60-604-02
MBU 125 under-desk mount kit	70-077-01
MBD 129 through-desk mount kit	70-077-02
PMK 300 projector mount kit	70-374-01
PMK 350 low profile projector mount kit (black, white)	70-563-02, 03

Accessories

These items can be ordered separately:

Accessory	Part number
DVID SL Pro/6 DVI-D male-to-male, 6' (1.8 m) cable	26-649-06
HDMI M-M Pro/6 HDMI male to male, 6' (1.8 m)	26-650-06
HDMI M-DVI-DM/6 HDMI male to DVI-D male, 6' (1.8 m)	26-614-02
BNC cable	26-383-xx
HDMIF-DVIDM HDMI female to DVI-D male adapter	26-616-01
HDMIM-DVIDF HDMI male to DVI-D female adapter	26-617-01

Mounting the Transmitter and Receiver

CAUTION: Installation and service must be performed by authorized personnel only.

Any of the 1-inch high, quarter-rack width units can be placed on a tabletop, mounted on a rack shelf, or mounted under or through a desk or other furniture. The receiver can be mounted to a projector bracket.

Tabletop Use

Affix the four included rubber feet to the bottom of the unit and place it in any convenient location.

Mounting

If desired, mount the unit using any of the following optional kits:

- RSU 126 6-inch deep universal rack shelf kit (part number 60-190-10)
- RSB 126 6-inch deep basic rack shelf (part number 60-604-11)
- RSU 129 9.5-inch deep universal rack shelf kit (part number 60-190-01)
- RSB 129 9.5-inch deep basic rack shelf (part number 60-604-02)
- MBU 125 under-desk mounting kit (part number 70-077-01)
- MBD 129 through-desk mounting kit (part number 70-077-02)
- PMK 300 projector mount kit (part number 70-374-01)
- PMK 350 low profile projector mount kit (black, white) (part number 70-563-02, 03)

Follow the instructions included with the kit.

UL Guidelines for Rack Mounting

The following Underwriters Laboratories (UL) guidelines pertain to the installation of a FOXBOX Tx/Rx unit into a rack.

1. **Elevated operating ambient —** If installed in a closed or multi-unit rack assembly, the operating ambient temperature of the rack environment may be greater than room ambient. Therefore, consider installing the equipment in an environment compatible with the maximum ambient temperature specified by Extron (Tma = +122 °F [+50 °C]).
2. **Reduced air flow —** Installation of the equipment in a rack should be such that the amount of air flow required for safe operation of the equipment is not compromised.
3. **Mechanical loading —** Mounting of the equipment in the rack should be such that a hazardous condition is not achieved due to uneven mechanical loading.
4. **Circuit overloading —** Consideration should be given to the connection of the equipment to the supply circuit and the effect that overloading of the circuits might have on overcurrent protection and supply wiring. Appropriate consideration of equipment nameplate ratings should be used when addressing this concern.
5. **Reliable earthing (grounding) —** Reliable earthing of rack-mounted equipment should be maintained. Particular attention should be given to supply connections other than direct connections to the branch circuit (such as the use of power strips).

Extron® Warranty

Extron Electronics warrants this product against defects in materials and workmanship for a period of three years from the date of purchase. In the event of malfunction during the warranty period attributable directly to faulty workmanship and/or materials, Extron Electronics will, at its option, repair or replace said products or components, to whatever extent it shall deem necessary to restore said product to proper operating condition, provided that it is returned within the warranty period, with proof of purchase and description of malfunction to:

USA, Canada, South America, and Central America:
Extron Electronics
1001 East Ball Road
Anaheim, CA 92805
U.S.A.

Japan:
Extron Electronics, Japan
Kyodo Building, 16 Ichibancho
Chiyoda-ku, Tokyo 102-0082
Japan

Europe, Africa, and the Middle East:
Extron Europe
Hanzeboulevard 10
3825 PH Amersfoort
The Netherlands

China:
Extron China
686 Ronghua Road
Songjiang District
Shanghai 201611
China

Asia:
Extron Asia
135 Joo Seng Road, #04-01
PM Industrial Bldg.
Singapore 368363
Singapore

Middle East:
Extron Middle East
Dubai Airport Free Zone
F12, PO Box 293666
United Arab Emirates, Dubai

This Limited Warranty does not apply if the fault has been caused by misuse, improper handling care, electrical or mechanical abuse, abnormal operating conditions, or if modifications were made to the product that were not authorized by Extron.

NOTE: If a product is defective, please call Extron and ask for an Application Engineer to receive an RA (Return Authorization) number. This will begin the repair process.

USA: (714) 491-1500 **Europe**: +31.33.453.4040
Asia: +65.6383.4400 **Japan**: +81.3.3511.7655

Units must be returned insured, with shipping charges prepaid. If not insured, you assume the risk of loss or damage during shipment. Returned units must include the serial number and a description of the problem, as well as the name of the person to contact in case there are any questions.

Extron Electronics makes no further warranties either expressed or implied with respect to the product and its quality, performance, merchantability, or fitness for any particular use. In no event will Extron Electronics be liable for direct, indirect, or consequential damages resulting from any defect in this product even if Extron Electronics has been advised of such damage.

Please note that laws vary from state to state and country to country, and that some provisions of this warranty may not apply to you.

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